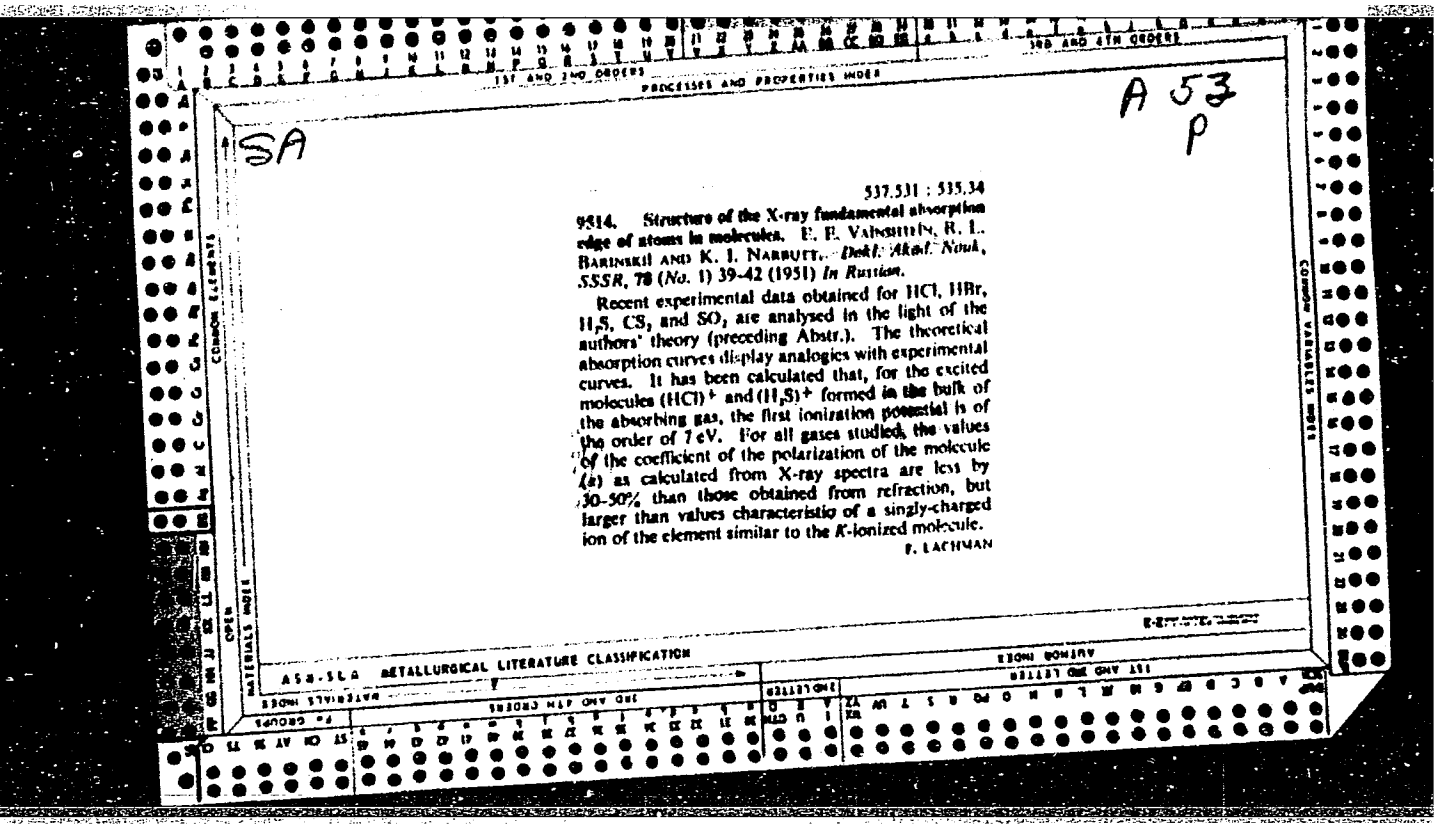
CA

3

The theory of the principal x-ray absorption edge of atoms in molecules. E. B. Vainshtein, R. L. Barinskii, and K. I. Narbutt. *Doklady Akad. Nauk* 77, 1003-6(1951).—If the first two absorption lines are assumed due to transition of K electrons to the $4p$ and $5p$ levels, it can be shown that the quantum defect $\Delta = 1.77$, and the K–$4p$ absorption line is 2.7 e.v. away from the true absorption edge. The formula $T_s = \text{const.}\ (\nu\eta^4/Z^4 n^{*4})$, where T_s is the relative intensity of a selective absorption line, n and n^* are the principal and effective quantum numbers of the final state, resp., ν is frequency, η is the effective charge of the atom or mol. after ionization and Z is the at. no., gives the intensity ratios 1:0.33:0.15:0.078 for the strongest lines at the K-edge of A. Parratt (*Phys. Rev.* 46, 843(1934)) found this ratio to be 1:0.31:0.18:0.085. Similar agreement with expt. can be obtained by applying Δ values obtained from Rb and Cs optical spectra to the calcn. of Kr and Xe absorption spectra.

Cyrus Feldman



537.531 : 535.34

9514. **Structure of the X-ray fundamental absorption edge of atoms in molecules.** E. E. Vainshtein, R. L. Barinskii and K. I. Narbutt. *Dokl. Akad. Nauk, SSSR*, 78 (*No.* 1) 39-42 (1951) *In Russian.*

Recent experimental data obtained for HCl, HBr, H_2S, CS, and SO, are analysed in the light of the authors' theory (preceding Abstr.). The theoretical absorption curves display analogies with experimental curves. It has been calculated that, for the excited molecules $(HCl)^+$ and $(H_2S)^+$ formed in the bulk of the absorbing gas, the first ionization potential is of the order of 7 eV. For all gases studied, the values of the coefficient of the polarization of the molecule (δ) as calculated from X-ray spectra are less by 30-50% than those obtained from refraction, but larger than values characteristic of a singly-charged ion of the element similar to the K-ionized molecule.

P. Lachman

VAYNSHTEYN, E. Ye.

USSR/Physics - Spectroscopy 1 Jul 51

"Relation Between the Theory of Basic X-ray Absorption Boundary and the Theory of Fine Structure," R. L. Barinskiy, K. I. Narbutt, E.Ye. Vaynshteyn, Inst of Geol Sci, Acad Sci USSR and Inst of Geochem and Analyt Chem imeni V. I. Vernadskiy, Acad Sci USSR

"Dok Ak Nauk SSSR" Vol LXXIX, No 1, pp 49-52

Authors establish formaulas defining lines of selective absorption and real absorption boundary. Comparison of theory and exptl results is possible after elimination from exptl curve of absorption lines and boundary; center of latter should be taken as origin of fluctuations on energy scale. Presented by Acad A. A. Lebedev 30 Apr 51.

210T80

USSR/Physics - X-Ray Absorption 11 Jul 51
Coefficient

"Magnitude of the Jump in the Coefficient of X-Ray Absorption," E. Ye. Vaynshteyn, R. L. Barinskiy, K. I. Narbutt, Inst of Geochem and Analyt Chem imeni Vernadskiy and Inst of Geol Sci, Acad Sci USSR

"Dok Ak Nauk SSSR" Vol LXXIX, No 2, pp 225-228

Study dependence of subject jump on atomic number; jump in the case of krypton; and jump of argon. States that Kramers' theory is not satisfactory for small Z starting at Z=25. State that the agreement

214T73

of Jonsson's relation with data of expts is accidental. Knowledge of the effective quantum number n* is necessary. Submitted 20 Apr 1951 by Acad A. A. Lebedev.

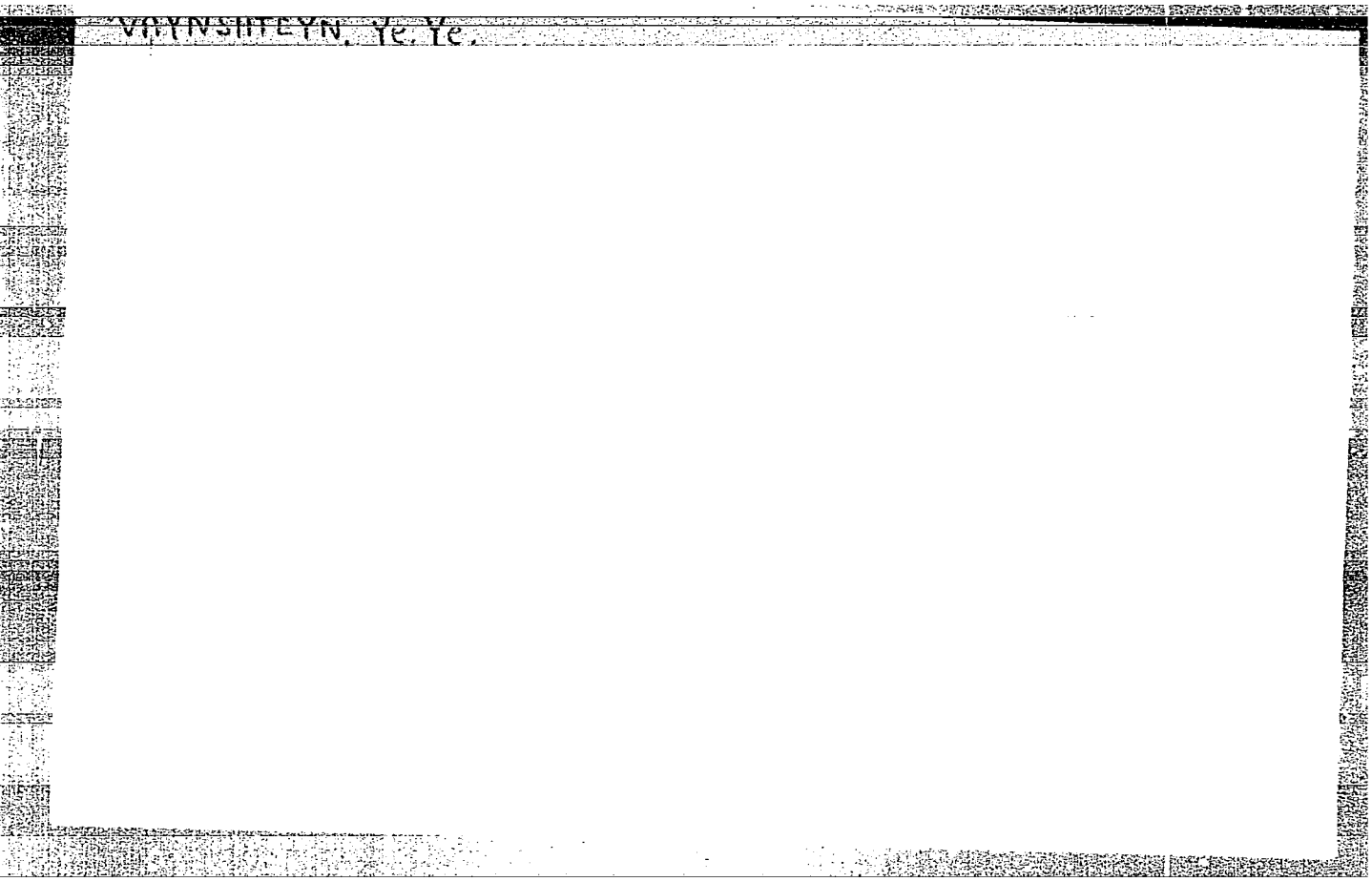
214T73

VAYNSHTEYN, E. Ye.

Chemical Abst.
Vol. 48 No. 8
Apr. 25, 1954
Electronic Phenomena and Spectra

(2)

New method for plotting a darkening curve and its use in x-ray chemical analysis. E. B. Vainshtein and N. V. [illegible] (Inst. Geochem. Anal. Chem., Acad. Sci., Moscow). *J. Anal. Chem.* (U.S.S.R.) 7, 203-5(1952) (Engl. translation).—See *C.A.* 47, 1484i. H. L. H.



VAYNSHTEYN, E. YE.

PA 236T87

USSR/Physics - X-Ray Spectroscopy Nov 52

"Computation of Structure of Basic X-Ray Boundary of Absorption of Atoms and Molecules," E. Ye. Vayshteyn, R. L. Barinskiy, K. I. Narbutt, Inst Geochem and Analytic Chem and Inst of Geolog Sci, Acad Sci USSR

"Zhur Eksper i Teoret Fiz" Vol 23, No 5, pp 593-608

Describes method of computation of fine structure of basic X-ray boundary of absorption. With help of this method the interpretation of X-ray

236T87

spectra could be made for a number of gaseous mols and simple ions in soln. It enabled establishment of constants of absorbing mols, such as ionization potential, polarizability, etc. Received 21 Mar 52.

236T87

VAYNSHTEYN, E. YE.

USSR/Physics - Roentgenography 21 Jan 52

"Utilizing the Jump in the Coefficient of Roentgen Absorption For Calculating the Fine Structure of the Ground Region," R. L. Barinskiy, E. Ye. Vaynshteyn, K. I. Narbutt, Inst of Geol Sci and Inst of Geochem and Analyt Chem imeni V. I. Vernadskiy, Acad Sci USSR

"Dok Ak Nauk SSSR" Vol LXXXII, No 3, pp 354-358

Give the results of calcns of the absorption spectra of germanium compds GeH_4, Ge_2H_6, $GeBr_4$, $GeCl_4$. Submitted by Acad A. A. Lebedev 22 Nov 51.

211T98

NARBUTT, K. I., BARINSKIY, R.L., VAYNSHTEYN, E. Ye.

Spectrum Analysis

Structure of basic region of absorption of ions in solution as determined by X-ray. Dokl. ANSSSR , 82, No. 4, 1952. Institut Geologicheskikh Nauk I Institut Geokhimii I Analiticheskoy Khimii im. V. I. Vernadskogo Akademii Nauk SSSR. Rcd. 2 Nov. 1951

SO: Monthly List of Russian Accessions, Library of Congress, _____1953, Uncl.

VAYNSHTEYN, E. YE.

USSR/Physics - X-ray Absorption 11 Feb 52

"Structure of the Main X-ray Absorption Limit of Atoms in Polar Crystals and Its Connection With Ultraviolet Absorption," E. Ye. Vaynshteyn, K. I. Narbutt, R. L. Barinskiy, Inst of Geochem and Anal Chem imeni Vernadskiy, and Inst of Geol Sci, Acad Sci USSR

"Dok Ak Nauk SSSR" Vol 82, No 5, pp 701-704

Authors consider subject study in the case of KCl, using data of I. Tischka (cf. Phys Rev 67, 313, 1945). They oppose the quasi-atomic approach to the study of the X-ray absorption spectra of atoms in crystals. Authors use the method of free energy levels of polar crystals. Submitted by Acad A. A. Lebedev 10 Dec 51.

230T94

230T94

USSR/Physics - Transitional Elements 11 Mar 52

"Structure Governing the X-Ray Ground Limit of Absorption of the Transitional Elements When in Chemical Composition," R. L. Barinskiy, E. Ye. Vaynshteyn, K. I. Narbutt, Inst of Geol Sci and Inst of Geochem and Analyt Chem imeni Vernadskiy, Acad Sci USSR

"Dok Ak Nauk SSSR" Vol LXXXIII, No 2, pp 199-202

Considers the very important exptl facts that confirm the representations, expounded in current article, concerning the nature of the complex structure governing subject absorption in the atoms

214T85

of the transitional elements. Concludes that the X-ray absorption spectra of the atoms in metals and compds are qualitatively very similar, which similarity is so great that it is difficult to admit any great difference in the causes for the appearance of the fine structure in both cases. Submitted by Acad A. F. Ioffe, 11 Jan 52.

214T85

VAYNSHTEYN, E. Ye.

USSR/Physics - X-Ray Spectra

"The Connection Between the Structure of Ground X-ray Border of Absorption and the X-ray Emission Spectra of Atoms in Molecules and Polar Crystals," K.I. Narbutt, E. Ye. Vaynshteyn, and R. L. Barinskiy, Inst of Geolog Sci and Inst of Geochem and Analytical Chem imeni Vernadskiy, Acad Sci USSR

"Dok Ak Nauk SSSR" Vol 87, No 3, pp 381-384

Discuss the energy spectrum of KCl crystal. Assert considerable difficulty in measuring the wave lengths of its lines, which accounts for the discrepancies between the computed and experimental values. Submitted by Acad I. I. Chernyayev 29 Sep 52.

245T108

21 Nov 52

VAYNSHTEYN, E.

PA 245T108

[redacted]

(tablitsy po rentgenovskoi spektroskopii [Reference Tables on Roentgen Spectroscopy]. Moscow, Izdatel'stvo Akad. [redacted] Inst. Crystallogr. and Anal. Chem., 1953. 23 pp.

VAINSHTEYN, E.E.

Chemical Abst.
Vol. 48 No. 4
Feb. 25, 1954
Electronic Phenomena and Spectra

Method of calculating photometric curves in studying x-ray absorption edges. E. E. Vainshtein (Acad. Sci. U.S.S.R., Moscow). *Zhur. Anal. Khim.* 8, 311–13(1953).—The outlined method enables the calcn. of the quant. characteristics of the absorption edge without recalcg. an exptl. photometric curve expressed in terms of blackening into a curve giving the relation between the absorption coeff. and frequency. It was shown that $P = W + l(S - W)$, where $S = \log (i_0/i)$, $W = \log [(i_0 - i)/i]$, and l is a const. depending on the photographic material and to some extent on the wave length. For the range of $S = 0.1$ to $S = 2$, $P = \gamma_p \log I - i_p$. Consts. l and γ_p can be calcd. (*C.A.* 42, 7637h; 47, 1484i). In the absence of a blackening curve advantage is taken of the intensity ratio of the components of the doublet $K\alpha_{1,2}$. l is calcd. by detg. the blackening of $K\alpha_1$ and $K\alpha_2$ and the corresponding values of W. It is shown further that $\gamma_s = \Delta S_{1,2}/\log 2$ and $\gamma_p = \gamma_s [l + (1 - l)\, dW/dS)]$. In the cases studied, $dW/dS = 1.08$ (cf. *C.A.* 47, 5839a). It is shown that $P = P_0 - 0.43\, \gamma_s \alpha l$, where $P_0 = \gamma_s \log I - i_p$. The use of this formula is illustrated on an exptl. curve on which S (blackening) is plotted *vs.* ν.

MacHovec

VAYNSHTEYN, Ye.Ye.

Methodology of quantitative x-ray analysis. II. E. E. Vainshtein and N. V. Turanskaya (V. I. Vernadskii Inst. Geochem. Anal. Chem., Acad. Sci. U.S.S.R., Moscow). *Zhur. Anal. Khim.* 8, 346–52(1953); cf. *C.A.* 47, [illegible]; 48, 1799g.—Previously outlined x-ray methods are applied to rare earths. The sum of rare earths or the abs. content of one of them in a sample is obtained by any of known methods, and the content of others in the sample is calcd. from $A_i = n_i A_0$ where A_i is the content of the sought element, n_i is a coeff. characterizing the relative compn. of the sample, and A_0 is the content of the element used for comparison. If the sum of rare earths in the sample (S) is known, individual calcns. can be made from $A_i = n_i S / \sum_{i=0}^{i=13} n_i$. Two cases for exptl. detn. of n_i are discussed: when the analyzed sample contains all the elements of the rare earths group and possibly elements of the subgroups in appreciable quantities and when the analyzed sample contains only some of the rare earths. In the first case, the width of spectral line method is used and n_i is obtained from the intensities ratio of 2 lines. In the 2nd case, it is preferable to use the previously discussed transformation of the darkening function. Details of calcns. are given.

M. Hosch

11/17/54

USSR/Physics - X-Ray Applications Aug 53

"Micro-Radiography and X-Ray Microscopy,"
D. B. Gorgoridze

Usp Fiz Nauk, Vol 50, No 4, pp 577-599

Reviews modern contact X-ray and electron X-ray microscopy and projective and diffractive X-ray microscopy, tested by author and associates E. Ye. Vaynshteyn and M. N. Flerova (ZhETF 10, Nos 1, 3, 8(1940)), and later "appropriated" by Americans (Barret, Metals techn. 12 (1945); W. J. Bond and Andrus, Amer Mineral 37 (1952)). Cites 43 references, mostly non-Soviet.

263T104

USSR/Physics - X-Ray Spectra, Absorptive 1 Aug 53

"X-Ray Absorption Spectra of Ions Ni, Cu and Zn in Aqueous and Nonaqueous Solutions," E. Ye. Vaynshteyn and V. S. Kavetskiy, Inst of Geochem and Analytic Chem im Vernadskiy, Acad Sci USSR and Voronezh State Univ

DAN SSSR, Vol 91, No 4, pp 775-778

Outline results of experimental study of X-ray spectra of absorption by ionic solutions of Zn, such as $ZnCl_2$ in acetone, pyridine, water, ethyl

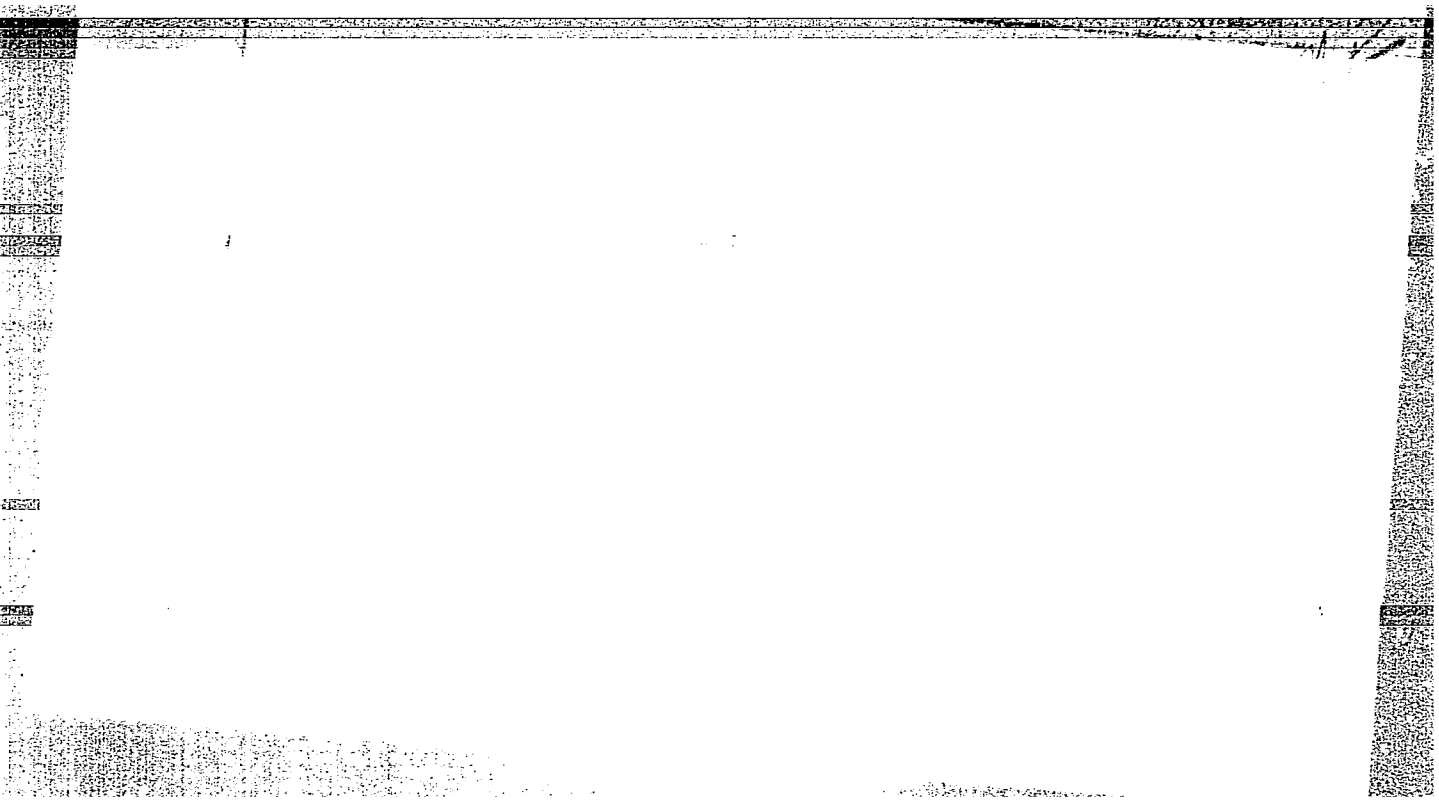
272T81

and methyl alcohol and glycerine, and Cu and Ni respectively dissolved in glycol, water, methyl alcohol and glycerine. Presents results in graphs and tables. Presented by Acad I. I. Chernyayev 13 May 53.

*RT-827 (On the theory of the fine structure of the x-ray absorption spectra of ions in solutions) K teorii tonkoi struktury rentgenovskikh spektrov pogloshcheniia ionov v rastvorakh.
DOKLADY AKADEMII NAUK SSSR, 91(5): 1059-1062, 1953.

VAINSHTEIN, E.E.

*RT-893 (A generalized equation for the transformed density function) Obobshchennoe uravnenie dlia preobrazovannoi funktsii pochernenila.
DOKLADY AKADEMII NAUK SSSR, 92(4): 723-725, 1953.



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VAYNSHTEYN, E.Ye.; KAKHANA, M.M.

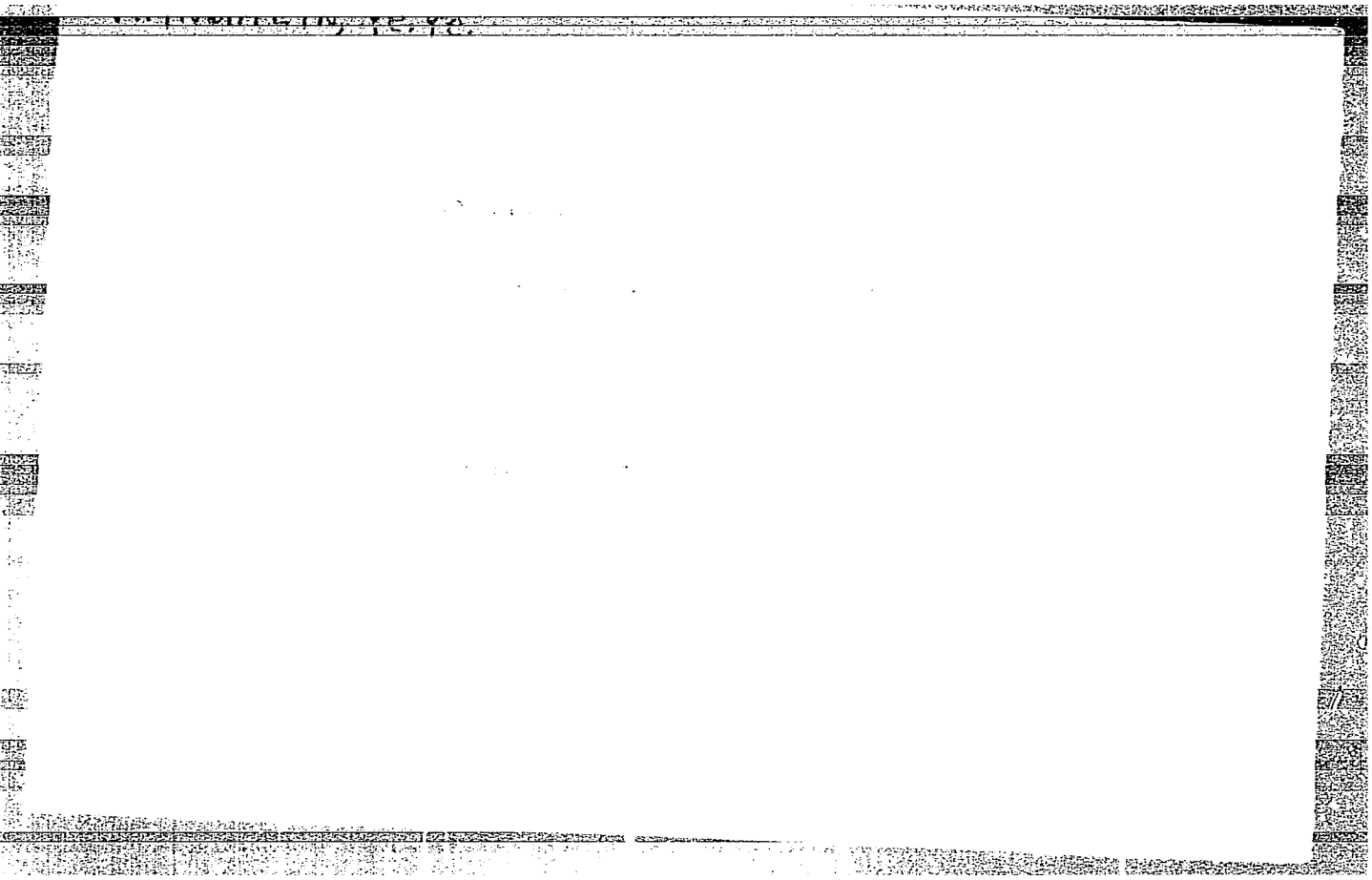
Mechanical P-converter. Zhur.anal.khim. 9 no.2:113-115 Mr-Ap '54.
(MLRA 7:3)

1. Institut geokhimii i analiticheskoy khimii im. V.I.Vernadskogo Akademii nauk SSSR, Moscow.
(Photochemistry--Conversion tables)
(Photographic emulsions)

VAYNSHTEYN, E.Ye.; BARINSKIY, R.L.; NARBUTT, K.I.

Theory of X-ray absorption spectra. (Remarks on A.I.Kostarev's and I.B.Borovskii's article). Zhur.eksp. i teor.fiz. 27 no.4:521-528 O '54. (MLRA 7:12)

1. Institut geokhimii i analiticheskoy khimii Akademii nauk SSSR. (Absorption spectra) (X-rays)



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VAYNSHTEYN, Ye. Ye.

7

Spectrum analysis of clays for basic components. E. E. Vainshtein, T. F. Borovik-Romanova, and V. V. Korolev. (V. I. Vernadskii Inst. Geochem. and Anal. Chem., Acad. Sci. U.S.S.R., Moscow.) *Zhur. Anal. Khim.* 10, 147-51 (1955). *J. Anal. Chem. U.S.S.R.* 10, 147-51 (1955) (English translation).—As basic components of clays, Si, Al, Fe, Mg, and Ca are considered. The effect of extraneous elements was reduced to a min. by dilg. the samples with CuO and powd. C. Favorable results were obtained by using a mixt. of sample: Cu:powd. C 1:39:60. Under conditions of this study (d.-c. C arc, 10 amp., 250 v.) good results were obtained with an exposure of 60 sec. The spectrum lines used in this method were: Si 2514.3, Al 3082.2, Ca 4226.7 and 3179.3, Mg 2779.8 and 2802.7, and Fe 2599.6 A. For comparison the lines Cu 4275.1, 3073.8, and 2441.6 A. were used. The basic components were detd. in wide range of concns. No interference of one element with another was observed. The reproducibility of results for Al_2O_3 was 1.4, for Fe_2O_3 2.5, for CaO 4.3, for SiO_2 4.5, and for MgO 5.8%. The av. deviation of the results from those of chem. analysis was 4-6%.

M. Hoseh

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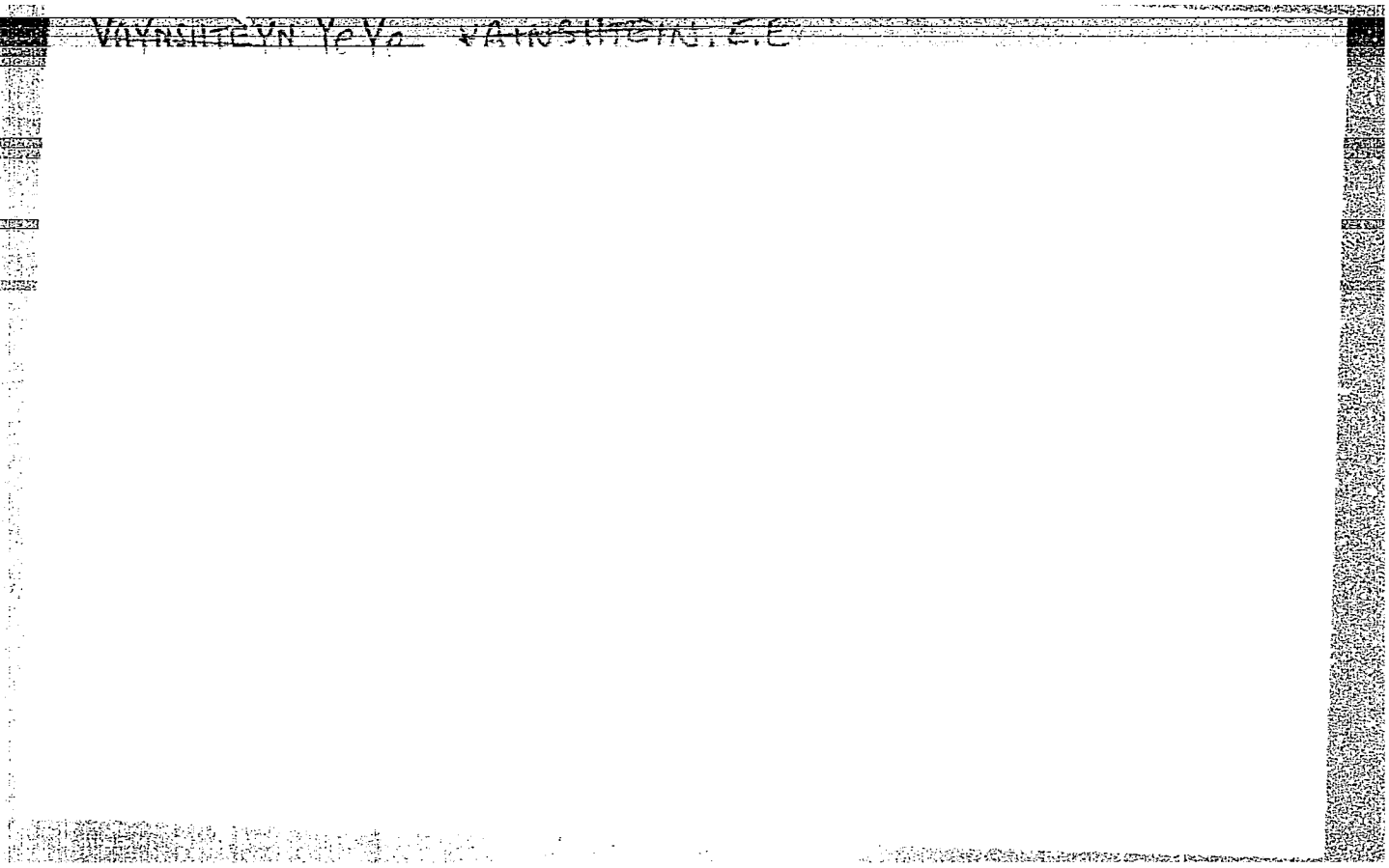


VAYNSHTEYN, E.Ye.;BOROVIK-ROMANOVA, T.F.;KOROLEV, V.V.

Spectrum analysis of the basis components of clay. Izv.AN SSSR.Ser.fiz. 19 no.2:194 Mr-Ap '55. (MLRA 9:1)

1.Institut geokhimii i analiticheskoy khimii imeni V.I.Vernadskogo.
(Tartu--Spectrum analysis--Congresses)

VAYNSHTEYN, Ye.Ye.

Distribution of the rare earth elements in monazite. B. E. Vainshtein, A. I. Tugarinov, and N. V. Turanskaya. *Doklady Akad. Nauk S.S.S.R.* 104, 268–71(1955).—Samples of monazite from different petrographic provinces and variant genetic conditions were analyzed by x-ray spectrometry with an accuracy of ±10% of the abs. detns. for the single elements. If the contents in Nd are taken as a unit the ratios Sm/Nd, Pr/Nd, La/Nd, and Ce/Nd are remarkably const. for all "rock-forming" monazites (enriched in placers from Brazil, Ukraine, Ural, and Transbaikalia) and do not vary beyond the limits of the accuracy of the detns. Monazites from pegmatites show, in contrast with those from granites, an enrichment in Sm but less Ce and La, e.g. in pegmatites from Kareliya, Madagascar, Brazil, Transbaikalia, and the Borshchevochnyi Kryazh, while those from other pegmatites from Ukraina, Yakutia, and Korea, behave like granites. Monazites from pegmatites changed by hydrothermal actions and those occurring in quartz or carbonate veins, on the other hand, showed increased amts. of La and Ce but reduced amts. of Sm, the latter near the limits of a detn. The ratio La/Ce/Pr is remarkably const. in all of the monazites. The hydrothermally changed pegmatites are typical for rock complexes without any ore deposition, and the differentiation of the rare earth elements is not different from that in granites. Anomalous ratios in the occurrence of rare earth elements always indicate chem. conditions of ore deposition. The discussion of the "hydrothermal monazites" does not concern the special conditions by which the rare earth elements of the Y group are enriched in carbonate deposits, viz. by the analogy of the cationic radii of Ca, Y, and Sm. W. Eitel

VAYNSHTEYN, E. YE.

USSR/Physical Chemistry - Crystals, B-5

Abst Journal: Referat Zhur - Khimiya, No 19, 1956, 60906

Author: Vaynshteyn, E. Ye., Staryy, I. B., Bril', M. N.

Institution: None

Title: Fine Structure of Fundamental Roentgen K-Spectrum of Absorption of Titanium in Some Dielectrics

Original Periodical: Dokl. AN SSSR, 1955, 105, No 5, 943-946

Abstract: By means of a focusing vacuum spectrograph of high resolving power a study has been made of fine structure of roentgen K-edge of absorption of Ti in rutile, brookite, anatase, perovskite, ilmenite, and metallic Ti. Analyzer-quartz, reflecting planes ($10\bar{1}1$). Radius of crystal curvature 2,545 mm. Crystal was bent at 4 points. Linear dispersion of instrument 2.5 X/mm. Conditions 50 ma, 11 kv. Anode Au. Density of substance in absorbers 6-13 mg/cm^2. Exposure 4-12 hours. Experimentally detected difference in fine structure of edges of absorption of Ti in metal and compounds is interpreted on the

Card 1/2

USSR/Physical Chemistry - Crystals, B-5

Abst Journal: Referat Zhur - Khimiya, No 19, 1956, 60906

Abstract: basis of theoretical notions developed previously (Barinskiy, R. L., Vaynshteyn, E. Ye., Narbut, K. I., Dokl. AN SSSR, 1952, 83, 199; Dokl. AN SSSR, 1952, 82, 701).

Card 2/2

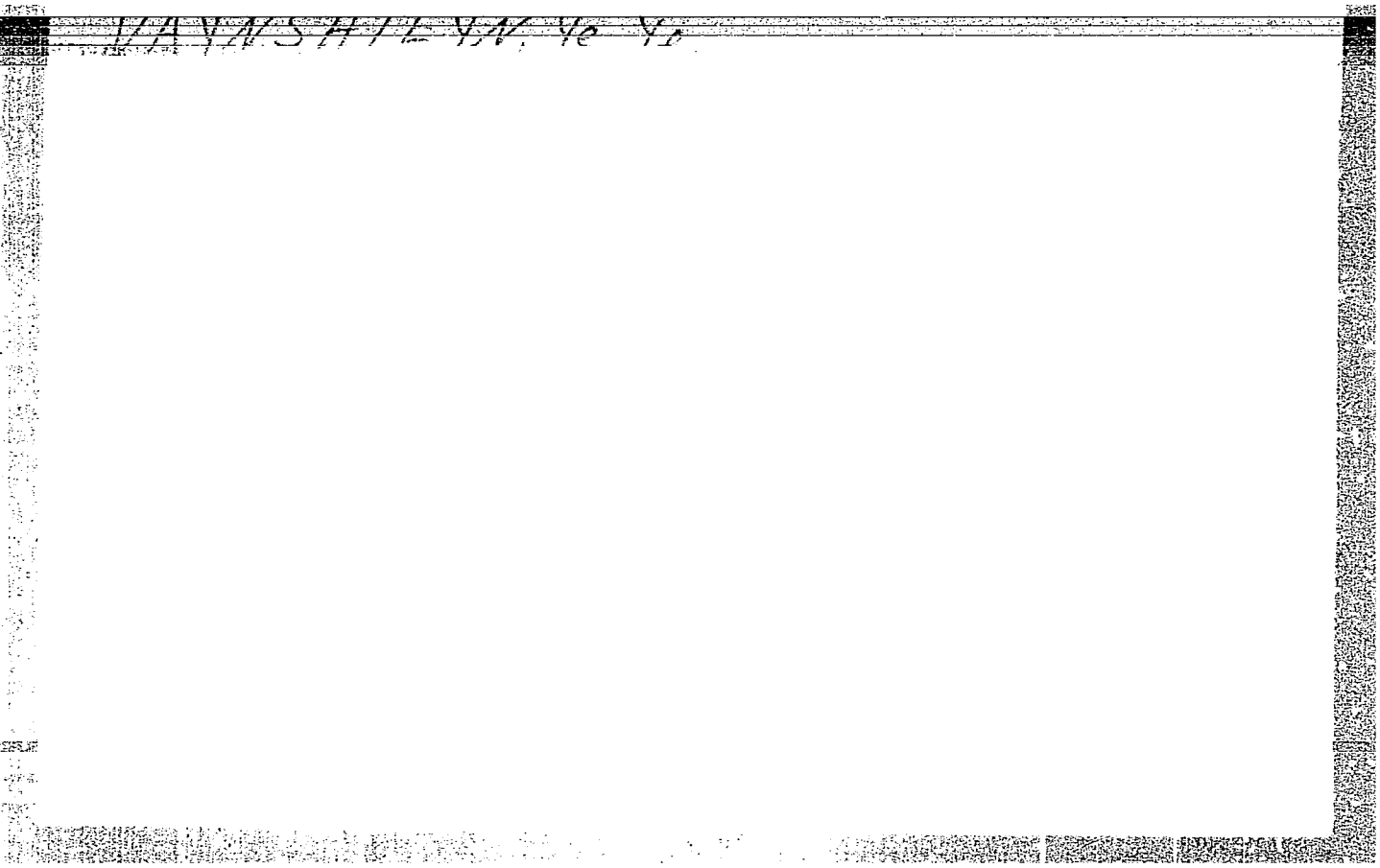
VAYNSHTEYN, E.Ye; BARINSKIY, R.L.; NARBUTT, K.I.

Regular patterns in the structure of principal X-ray K absorption limits for atoms in alkali metal halide crystals. Dokl.AN SSSR 105 no.6:1196-1199 D '55. (MLRA 9:4)

1.Institut geokhimii i analiticheskoy khimii i Laboratoriya mineralogii i geokhimii redkikh elementov, Institut geologicheskikh nauk Akademii nauk SSSR. Predstavlena akademikom N.V.Belovym.
(Alkali metal halides--Spectra) (X rays)

VAYNSTEYN Emmanuil Yefimovich; VINOGRADOV, A.P., akademik, redaktor; HAZUMOVA, L.L., redaktor; MAKUNI, Ye.V., tekhnicheskiy redaktor.

[Methods of quantitative X-ray spectrum analysis] Metody kolichestvennogo rentgenospektral'nogo analiza. Moskva, Izd-vo Akademii nauk SSSR, 1956. 221 p. (MLRA 9:6)
(X-ray spectroscopy)



Vaynshteyn, E.Ye.

USSR/ Analytical Chemistry - Analysis of Inorganic Substances G-2

Abs Jour : Referat Zhur - Khimiya, No 4, 1957, 12070

Author : Vaynshteyn E.Ye., Pavlenko L.I.
Title : Effect of Overall Composition of Rocks on the Results of Quantitative Determination of Molybdenum in Granitoids

Orig Pub : Zh. analit. khimii, 1956, 11, No 4, 410-418

Abstract : It was ascertained that calibration curves for determination of Mo in granitoids and in diorite are parallel, but show a regular displacement in relation to each other. By means of tagged atoms an investigation was made of the processes of evaporation and excitation of elements in the source, and separate studies of them have been carried out. It was ascertained that in the rocks under study displacement of calibration graph for Mo determination, in relation to its position for granite, is proportional, at first approximation, to the content of Ca and Mg in the rock. In order to take into account the effect of overall

Card 1/2

- Vaynshteyn, E.Ye.

USSR/ Analytical Chemistry - Analysis of Inorganic Substances G-2

Abs Jour : Referat Zhur - Khimiya, No 4, 1957, 12070

composition of the samples, there is recorded on the plate which serves to register the spectra of Mo in the rocks, in addition to spectra of standards, prepared on the basis of a granite of definite chemical composition, also the spectrum of standard sample having a diorite composition with a known ratio of Ca and Mg to Si. On all the spectra are measured the blackening of analytical lines: Mg, Ca and Si, and by using the correlation between displacement of calibration graph, in relation to the granite, and the magnitude of relative content of Ca and Mg in the rock, a more precise determination is made of the position of the calibration graph for the determination of Mo content in each of the varieties of rocks. In the experiments were utilized as basic lines of the elements, Ca --2997.31 A, Mg --2776.69 A and Si --2438.78 A. Use of the method decreases considerably the analysis error.

Card 2/2

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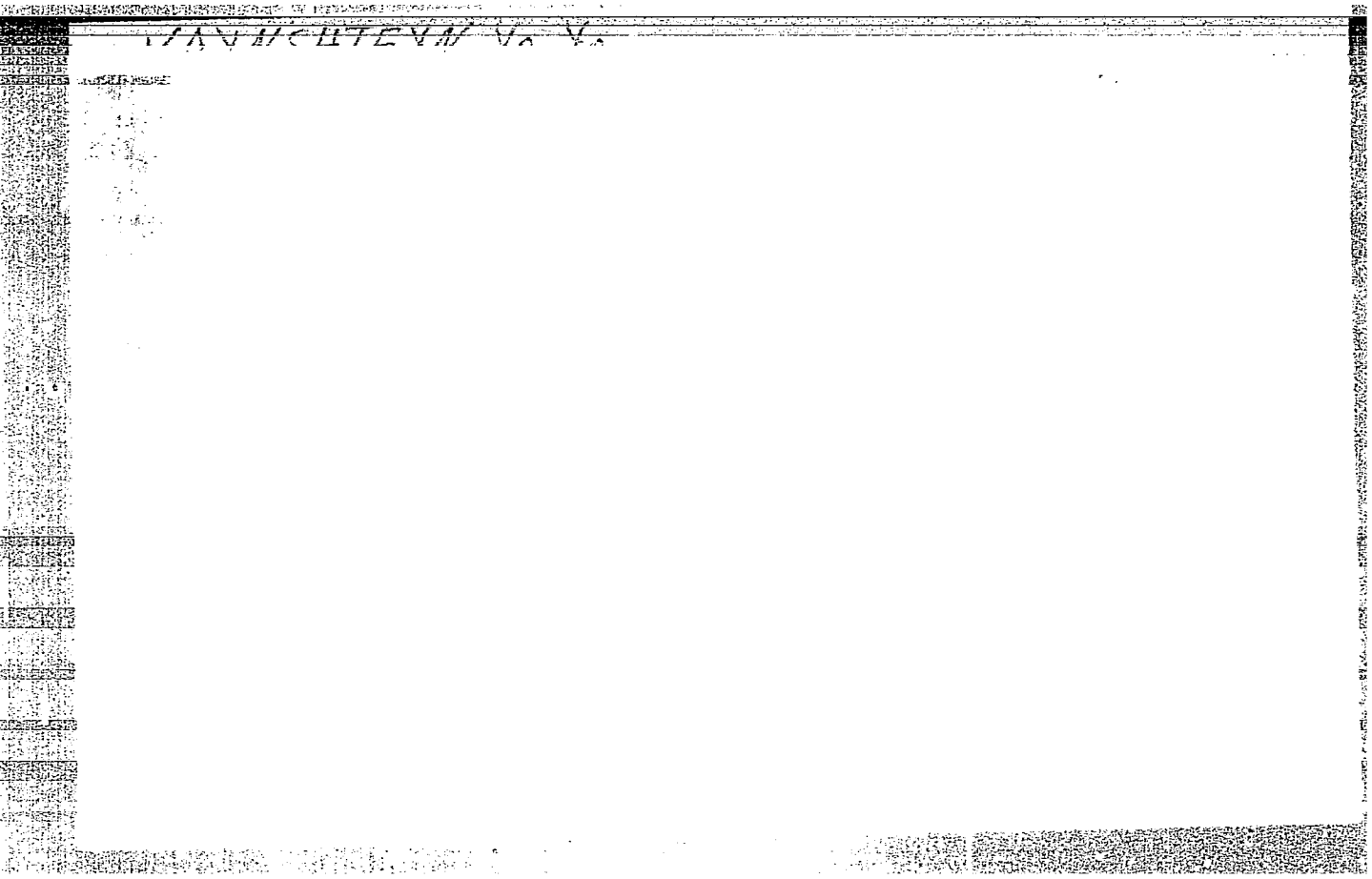


VAYNSHTEYN, E. Ye.

USSR/Fitting Out of Laboratories - Instruments, Their Theory, Construction, and Use, H

Abst Journal: Referat Zhur - Khimiya, No 19, 1956, 61963

Author: Narbutt, K. I., Vaynshteyn, E. Ye., Gil'varg, A. B., Belyayev, L. M.

Institution: None

Title: New Vacuum X-Ray Spectrograph RSD-2

Original Periodical: Izv. AN SSSR, ser. fiz., 1956, 20, No 2, 152-160

Abstract: X-ray spectrometer RSD-2 is designed for X-ray spectra investigations of K-series elements from K to Cu and L-series elements from Ag to Ta, and also for the study of minute structure of emission lines and boundary absorption. Spectrograph parts, high voltage equipment, vacuum assembly and measurement instruments are set up as a single unit. The dismountable, cooled X-ray tube is made as a separate component connected to the central chamber by a bellows and mounted on an arm that rotates around the vertical axis of the

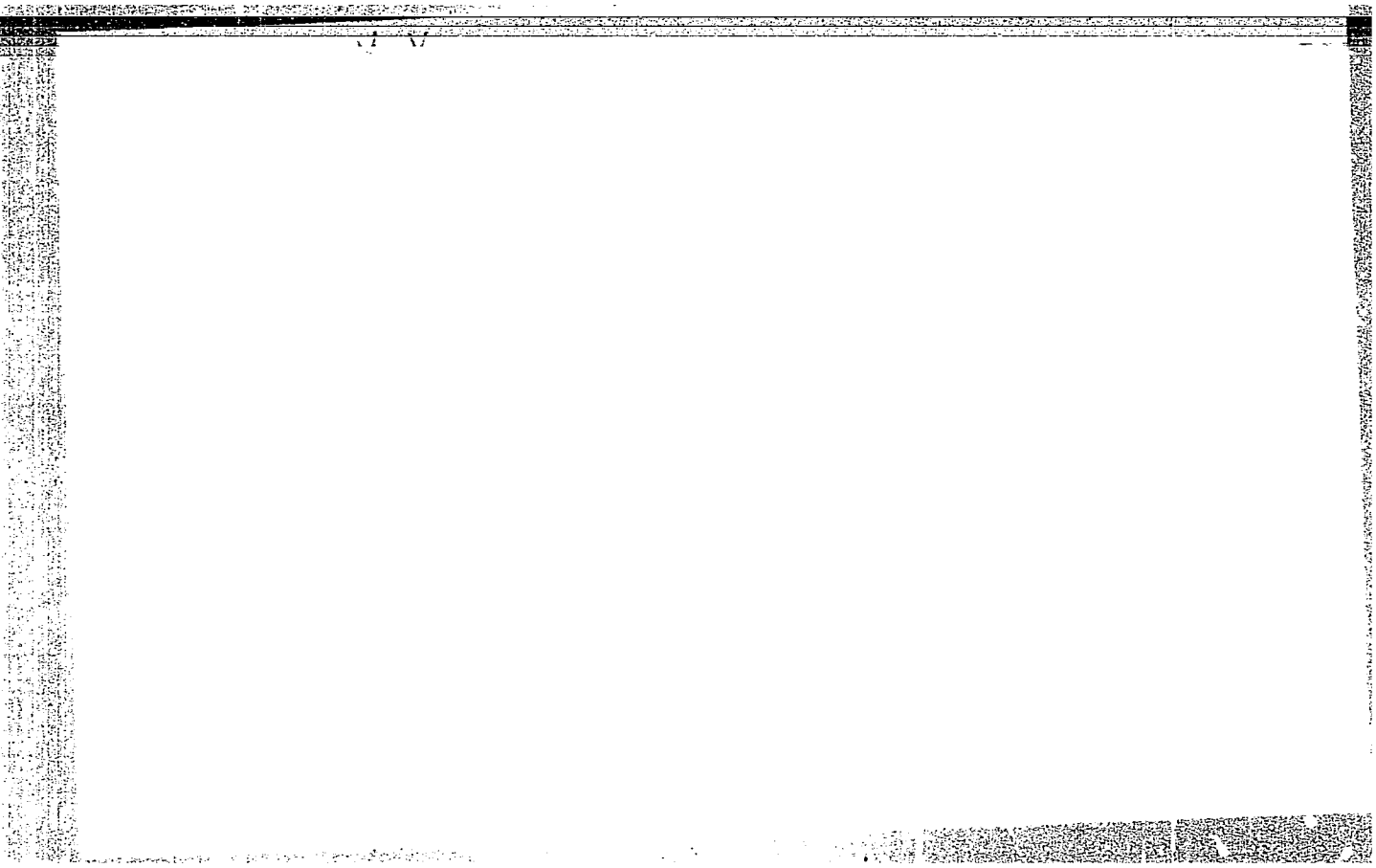
Card 1/2

USSR/Fitting Out of Laboratories - Instruments, Their Theory, Construction, and Use, H

Abst Journal: Referat Zhur - Khimiya, No 19, 1956, 61963

Abstract: central chamber. Angle range of arm rotation and actuation of the tube swinging mechanism are effected by 2 stops with Hg-contacts. Shape of the eccentric of the swinging mechanism is selected in such a manner as to ensure attainment of uniform sensitivity scale on roentgenoscopy. Focussing is effected in RSD-2 by a quartz crystal ground on both sides to a 1,000 mm radius and set in optical contact with cylindrical surface of the glass segment of crystal-holder (radius 500 mm). Discussions of effective surface of reflecting curved crystal 10 x 50 mm. Recording of X-ray spectra is done on motion picture film sensitive to wave length region 2,000-5,000 XE. To facilitate reading of spectra a wave length scale is printed on the film.

Card 2/2



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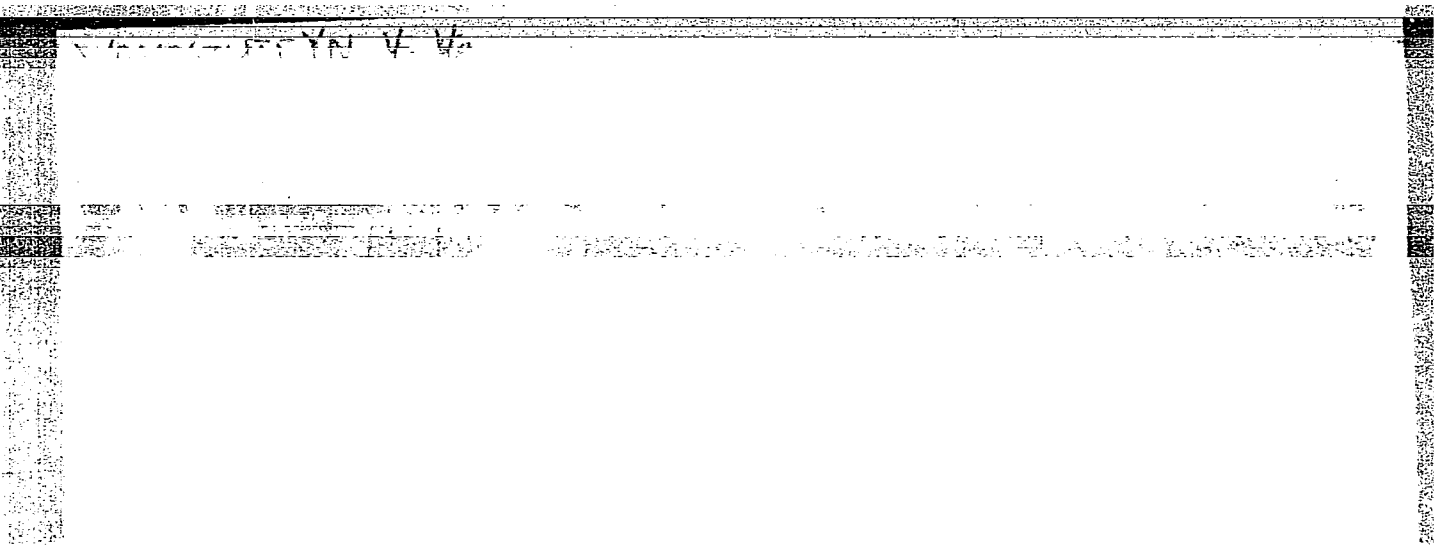

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VAYNSHTEYN, E. Ye.

D.

USSR/Cosmochemistry - Geochemistry. Hydrochemistry.

Abs Jour : Ref Zhur - Khimiya, No 9, 1957, 30354

Author : Vaynshteyn, E.Ye., Tugarinov, A.I., Turanskaya, N.V.
Inst : Academy of Sciences USSR
Title : Distribution of Rare-Earths in Monazites of Granitoids

Orig Pub : Dokl. AN SSSR, 1956, 106, No 4, 691-692

Abst : As a continuation of prior work (RZhKhim, 1956, 22243), the authors have investigated monazites of different genesis from 50 artificial concentrates collected in the granitic massif of Borshchevochnyy ridge (in Transbaikal region). Results of roentgenospectral analysis: granitic gneiss La/Nd = 1.4, Ce/Nd = 2.5, Pr/Nd = 0.27, Sm/Nd = 0.16, Cd/Nd = 0.08; Hybridized granites with xenolites -- La/Nd = 1.3-1.6, Ce/Nd = 2.3-2.7, Pr/Nd = 0.25-0.29, Sm/Nd = 0.14-0.18, Cd/Nd = 0.08: coarse-grain porphyritic granites -- La/Nd = 1.75, Ce/Nd = 2.85, Pr/Nd = 0.29, Sm/Nd = 0.12, Cd/Nd = 0.06; pegmatites -- La/Nd

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D.

USSR/Cosmochemistry - Geochemistry. Hydrochemistry.

Abs Jour : Ref Zhur - Khimiya, No 9, 1957, 30354

Ce/Nd = 2.15, Pr/Nd = 0.25, Sm/Nd = 0.22, Cd/Nd 0.11;
leucocratic granites -- La/Nd = 1.9, Ce/Nd 2.9,
Pe/Nd - 0.29, Sm/Nd = 0.25, Cd/Nd = 0.10.

Card 2/2

VAYNSTEYN, Ye.Ye.

CARD 1 / 2 PA - 1476

SUBJECT USSR / PHYSICS
AUTHOR VAJNSTEJN,E.E., KOTLJAR,B.I.
TITLE The X-Ray Emission Spectra of Mn and Cu in GEISLER'S Alloy in the Interval of Temperatures of Magnetic Transformation.

PERIODICAL Dokl.Akad.Nauk, 110, fasc.1, 44-47 (1956)
Issued: 11 / 1956 reviewed: 11 / 1956

The spectra were recorded by means of a focussing vacuum X-ray spectrograph of the JOHANN type with quartz serving as reflecting crystal. The fine structure of the $K\alpha_{12}$ lines of the elements was investigated by means of the secondary excitation method and the lines of the Kβ group were investigated by means of the primary method.
In the case of the primary method GEISLER'S alloy, which was prepared in form of wedges of from 1 to 2 cm thickness, was pressed into the pickup head of the anode, and was exposed in the case of two different modes of operation of the X-ray tube of the spectrograph (namely at a temperature that was noticeably below, and one that was noticeably above CURIE temperature). In the case of the secondary excitation method of the spectra the melting temperature was modified within range of magnetic transformation (300 - 340°) by 5° in each case.
The data concerning the modification of the asymmetry index of the $K\alpha_{1,2}$ lines of Me in Cu_2MnAl in the case of a change of temperature in the interval 300-340° is shown in a diagram. Outside this interval the temperature index remains constant. The $K\alpha_1$- and the $K\alpha_2$-line change their form in a similar manner. The widths of the two lines and the position of their maxima do not depend on the modification

Dokl.Akad.Nauk, 110, fasc.1, 44-47 (1956)

of the magnetic state of the alloys. In the case of Cu a modification of the asymmetry index similar to that in the case of Mn was observed. The modification of the magnetic state of the alloy Cu_2MnAl exercises practically no influence on the position of the $K\beta_1$-line of Mn and Cu. Also the form of these lines remains constant within the limits of measuring errors. However, on the occasion of a transition from the ferromagnetic to the paramagnetic state a considerable modification of the position and form of the $K\beta_5$-lines of both components of the alloy is noticed. Further modifications are pointed out. The $K\beta'$-line of manganese behaves on the whole like the $K\beta_5$-line. On the occasion of the transition from the ferromagnetic to the paramagnetic state the maximum of the $K\beta'$-line is thus shifted by $\sim 1{,}8$ MeV in the direction of long waves. The experimental material obtained here leaves no doubt as to the marked influence exercised by the magnetic state of the alloys on the X-ray spectra of the atoms. Some observations made by the authors are in good qualitative agreement with the theory taking account of the s-d-exchange interaction in ferromagnetica. For the purpose of acquiring more detailed knowledge concerning the ferromagnetism of alloys consisting of non-ferromagnetic components it would be necessary to extend the scope of research work. Also other alloys ought to be investigated.

INSTITUTION: Institute for Geochemistry and Analytic Chemistry of the Academy of Science in the USSR.
Pedagogic Institute of Odessa.

VAYNSHTEYN, Emanuil Yefimovich; VINOGRADOV, A.P., akademik, otvetstvennyy redaktor; RAZUMOVA, L.L., redaktor izdatel'stva; MAKUNI, Ye.V., tekhnicheskiy redaktor

[Apparatus of increased intensity and contrast for X-ray spectrum analysis; studies on the curves of crystals and new focusing spectrographs] Svetosil'naia apparatura dlia rentgenospektral'nogo analiza; issledovanie izgiba kristallov i novye fokusiruiushchie spektrografy. Moskva, Izd-vo Akad. nauk SSSR, 1957. 119 p. (MLRA 10:4)
(X-RAY SPECTROSCOPY)

VAYNSHTEYN, E. E., PAVLENKO, L.I., BELYAYEV, Y. I.

"The use of radio-active isotopes in spectral analysis," a paper submitted at the International Conference on Radioisotopes in Scientific Research, Paris, 9-20 Sep 57.

PAVLENKO, A.S.; VAYNSHTEYN, E.Ye.; SHEVALEYEVSKIY, I.D.

Hafnium and zirconium ratio in zircons of igneous and metasomatic rocks. (MIRA 12:3)
Geokhimiia no.5:351-367 '57.

1. V.I. Vernadskiy Institute of Geochemistry and Analytical Chemistry, Academy of Sciences, USSR, Moscow.
(Tuva Autonomous Province--Zircon)
(Hafnium) (Zirconium)

Vaynshteyn, E.Ye.

AUTHOR: Barinskiy, R.L., Vaynshteyn, E.Ye., Narbutt, K.I. 48-10-4/20

TITLE: The Dependence of X-Ray Spectra of Atomic Absorption in Compounds that have the Character of Chemical Compounds (Zavisimost' rentgenovskikh spektrov pogloshcheniya atomov v soyedineniyakh ot kharaktera khimicheskoy svyazi)

PERIODICAL: Izvestiya Akad.Nauk SSSR, Ser.Fiz., 1957, Vol. 21, Nr 10, pp. 1351-1361 (USSR)

ABSTRACT: In the course of the present theoretical representation the previously (ZhETF, 23, 593, 1952, DAN SSSR, 82, 355, 1952, and 82, 701, 1952) found empirical rules found by the authors can be explained and connected with one another. This applies to the rules governing the structure of atom-absorption-X-ray-edges in multi-atom compounds in which polar connection plays a predominant part. For the case of di-atomic compounds the following may be said: 1.) The extension of the basic absorption line series in the cation spectrum must always be less than that of the satellite series in the same spectrum; with the anion the opposite is the case. 2.) The relative intensity of the satellite series of absorption lines in the cation spectrum must always be greater than the corresponding quantity in the absorption spectrum of the anion in the same compound.

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48-10-4/20

The Dependence of X-Ray Spectra of Atomic Absorption in Compounds that have the Character of Chemical Compounds

3.) The shape of the selection lines of absorption within the domain of each series in the cation- and anion spectra in compounds with marked ion character of the compound must be near the form of dispersion. With a weakening of the ion character of the connecting forces, the shape of the lines is bound to deviate ever more from the theoretical one. 4.) The reciprocal position of the basic and of the satellite series of the absorption lines is determined by that state which, of the two utmost states in the case of the polarization of the molecule, has the minimum energy. 5.) The anisotropy of the polarizability of multi-atom molecules (e.g. of the halide salts of some metals such as Zn, Ge, etc.) depends upon their structure and therefore (in contrast to diatomic compounds) is in no direct connection with the polarizability of the ions forming the compound. The conclusions drawn here are quantitatively confirmed by the experiments. There are 12 figures and 12 references, 11 of which are Slavic.

ASSOCIATION: IMGRE, GEOKhI, IGEM, AS USSR (IMGRE, GEOKhI, IGEM Akademii nauk SSSR)

AVAILABLE: Library of Congress

Card 2/2

VAYNSHTEYN, E.YE.

48-10-9/20

AUTHOR: Barinskiy, P.L., Vaynshteyn, E.Ye.

TITLE: X-Ray L-Spectra of the Absorption and Emission of Molybdenum in Carbide and Some Other Compounds (Rentgenovskiye L-spektry poglo-shcheniya i emissii molibdena v karbide i nekotorykh drugikh soyedineniyakh)

PERIODICAL: Izvestiya Akad.Nauk SSSR, Ser.Fiz., 1957, Vol. 21, Nr 10, pp. 1387-1396 (USSR)

ABSTRACT: By means of a focusing vacuum-X-ray spectrometer the X-ray-L_{III} spectra of the absorption and emission of molybdenum in carbide and a number of other compounds was investigated. The influence exercised by the metal valence and the character of the chemical bond between the atoms in the compound upon the fine structure of these spectra is determined. Basing on the example of X-ray spectra of Mo in molybdenite the possibility of a considerable reciprocal overlapping of the L_{β_2} emission band and of the L_{III} spectrum of metal absorption is shown. Hitherto such a phenomenon has been observed only once, viz.on the occasion of the investigation of the $M_{IV,V}$-spectra of the absorption and of the $M_{\alpha,\beta}$ emission of rare earths. Opinions concerning the possible causes of this phenomenon and the conditions necessary herefore are expressed. Experimental data are obtained with respect to Mo_2C, which cannot be brought into line

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48-10-9/20

X-Ray L-Spectra of the Absorption and Emission of Molybdenum in Carbide and Some Other Compounds

with the hypothesis frequently found in publications, according to which, on the occasion of the forming of carbides of the transition elements, a partial filling up of the not completed energetical levels of atoms of transition metals takes place. To what extent this conclusion can be generalized must yet be found out on the basis of experimental material of much greater volume. There are 4 figures and 10 references, 8 of which are Slavic.

ASSOCIATION: Institute for Mineralogy, Geochemistry, and Crystallochemistry of Rare Elements AN USSR and Institute for Geochemistry and Analytical Chemistry imeni V.I.Vernadskiy AS USSR (Institut mineralogii, geokhimii i kristallokhimii redkikh elementov Akademii nauk SSSR i Institut geokhimii i analiticheskoy khimii im.V.I.Vernadskogo Akademii nauk SSSR)

AVAILABLE: Library of Congress

Card 2/2

Vaynshteyn, E.Ye.

48-10-19/20

AUTHOR: Kakhana, M.M., Vaynshteyn, E.Ye.

TITLE: On the Influence Exercised by Neutron Irradiation Upon the Fine Structure of the X-Ray Absorption-K-Spectrum of Germanium (O vliyanii neytronnogo oblucheniya na tonkuyu strukturu rentgenovskogo K-spectra pogloshcheniya germaniya)

PERIODICAL: Izvestiya AN SSSR Seriya Fizicheskaya, 1957, Vol.21, Nr 10, pp. 1459-1464 (USSR)

ABSTRACT: The present paper contains only preliminary information. The object of the investigation was the K-spectrum of germanium absorption in a semiconductor with electron conductivity, as well as in germanium dioxide. On the strength of the investigations carried out the following may be said: The spectrum of germanium absorption in solid dioxide is, compared to gaseous molecules, characterized by a lower value of the parameter n of the theory, viz. equal to 1.16. In the spectrum of germanium in solid dioxide this manifests itself by a more rapid decrease of the intensity of successive selection lines of absorption and in a greater extension of the basic series of the absorption line. The energetic position of the long wave boundary of the K-edge of absorption and the ratio between the intensities of the first two fluctuations of the absorption coefficient within the domain of the basic edge in irradiated and not irradiated germanium

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On the Influence Exercised by Neutron Irradiation Upon the Fine Structure of the X-Ray Absorption-K-Spectrum of Germanium

dioxide samples remain unchanged within the limit of experimental accuracy. The third maximum is, however, washed out by irradiation. Besides, a relatively slight decrease of the fluctuation amplitude of the absorption coefficient was observed within the domain of the so-called wide fine structure. It is pointed out that a modification of the third maximum in the absorption coefficient indicates the existence of a connection between the discovered effect and the influence exercised by the "admixture" atoms, which are created as a result of the capture of slow neutrons and of the irreversible vacancies by the germanium nuclei. There are 5 figures and 9 references, 7 of which are Slavic.

ASSOCIATION: Institute for Geochemistry and Analytical Chemistry imeni V.I. Vernadskiy AN USSR (Institut geokhimii i analiticheskoy khimii im. V.I.Vernadskogo Akademii nauk SSSR)

AVAILABLE: Library of Congress

VAYNSHTEYN, YE. YE.

20-1-13/64

AUTHOR VAYNSHTEYN, Ye.B., VASIL'EV, Yu.N.

TITLE The Influence of Chemical Bond on the Fine Structure of the Lines of the Kβ-Group of the X-Ray Spectrum of Titanium in Some of Its Compounds. (Vliyaniye khimicheskoy svyazi na tonkuyu strukturu liniy Kβ-gruppy rentgenovskogo emissionnogo spektra titana v nekotorykh soyedineniyakh -Russian)

PERIODICAL Doklady Akademii Nauk SSSR, 1957, Vol 114, Nr 1, pp 53-56 (U.S.S.R.)

ABSTRACT The paper under review is a comparative investigation of the fine structure of the lines of the K-series of the X-ray emission spectrum of titanium in its dioxide (rutile), in the simple and in the composed titanium-tungsten carbide, in the nitride, and in the hydride. The determination of these data is of interest for the theory of X-ray spectra and also for the solution of the problem of the nature of the forces of chemical bound in these compounds. The paper contain a brief discussion of the production of the above-mentioned compounds. Radiographic controls of the structure of the preparations both preceded and followed the X-ray spectral analysis. The X-ray spectra were obtained with the aid of a vacuum X-ray spectrograph RSD-2 with a quatz crystal as analyzer. The paper under review discusses details of the apparatus and of the measuring method. Two diagrams give a clear picture of the experimental results obtained; these results characterized the relative position, the form, and the ratio of the intensities of the $K\beta''_{2,3}$, $K\beta_5$-, $K\beta''_1$ and $K\beta'_2$-lines in the X-ray spectra of titanium in the different compounds. At the same time investigations were also

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The Influence of Chemical Bond on the Fine Structure of the Lines of the Kβ-Group of the X-Ray Spectrum of Titanium in Some of Its Compounds.

carried out with respect to the change of the position and of the form of the $K\beta_1$-line in the same compounds. The experimental results obtained permit to draw the following conclusions: (1) The form and the position of some lines of emission of the Kβ-group of titanium ($K\beta_1$ and $K\beta'$") remain practically unchanged in the compounds investigated during the experiments described in the paper under review, and also their relative intensity does practically not change. (2) On the other hand, the $K\beta_1$-and Kβ'-lines of the X-ray spectrum of titanium as well as the $K\beta_5$-line are noticeably affected by the chemical bond. In the oxide and in both carbides their position remained unchanged. (3) Among the compounds investigated during the experiments described in the paper uncer review, the influence of the chemical bond appears to be particularly strong on the Kβ"-line of the metal. The change of the anion considerably displaces the position of these lines, changes their form and also strongly affects their relative intensity. (3 reproductions).

ASSOCIATION Institute for Geochemistry and Analytical Chemistry "V.I.Vernadskiy", Academy of Science of the U.S.S.R.

PRESENTED BY VINOGRADOV A.P., Member of the Academy

SUBMITTED 22.12.1956

AVAILABLE Library of Congress.

Card 2/2

AUTHORS: Vaynshteyn, E. Ye., Vasil'yev, Yu. N. 2o-114-4-17/63

TITLE: X-Ray Emission Lines of the Kβ-Group of Titanium in Carbides (Rentgenovskiye emissionnyye linii Kβ-gruppy titana v karbidakh)

PERIODICAL: Doklady Akademii Nauk SSSR, 1957, Vol. 114, Nr 4, pp. 741-744 (USSR)

ABSTRACT: The present paper represents the first part of a planned test series on the X-ray spectroscopic investigation of carbides, nitrides and hydrides of transition metals. These investigations are at present carried out by a group of collaborators in the Institute of Geochemistry and Analytical Chemistry of the Academy of Sciences of the USSR and in the X-ray laboratory of the Pedagogical Institute Odessa. The emission lines of the Kβ - group of the X-ray spectrum of titanium were investigated in several alloys, produced expressly for this purpose, of the system Ti-C with a metalloid content of 9-24%. The denotation and the composition of the investigated alloy are summarized in a table. The production of the alloys is shortly described. In the monophase region the authors observed a linear growth of the lattice period of carbides as soon as the carbon content approached 2o%. In alloys with a higher metalloid content the lattice period remained constant. For this work a focussing vacuum

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X-Ray Emission Lines of the Kβ -Group of Titanium in Carbides 20-114-4-17/63

spectrograph with a curved quartz crystal as analyzer was used. The titanium spectra were photographed in the second order of reflection. A diagram illustrates two such spectra which are given as examples. Details on the position and on the intensity of the individual lines are given. From the here obtained experimental data the following general conclusions may be drawn:
1) the position of the $K\beta_1$ and $K\beta_5$-lines in the titanium spectra in carbides with a carbon content of 9-20% remains unchanged. This is also true for the short-wave limit of the $K\beta_5$-line.
2) the distance between the maxima of the Kβ" and the $K\beta_5$-line in the X-ray spectra of carbides of various composition is 7,9 eV. These lines, according to their nature, form one single emission band with two distinctly separate maxima.
3) when the carbon content in the carbides increases the relative intensity of the Kβ -line or of the long-wave maximum of the entire Kβ" and -$K\beta_5$ absorption band of titanium in the alloy also increases. There are 3 figures, 1 table, and 9 references, 8 of which are Slavic.

ASSOCIATION: Institute of Geochemistry and Analytical Chemistry imeni

Card 2/3

X-Ray Emission Lines of the Kβ- Group of Titanium in Carbides 2o-114-4-17/63

V. I. Vernadskiy of the AS USSR (Institut geokhimii i analiticheskoy khimii im. V. I. Vernadskogo Akademii nauk SSSR)

PRESENTED: December 25, 1956 by A. P. Vinogradov, Member, Academy of Sciences, USSR

SUBMITTED: November 27, 1956

Card 3/3

VAYNSHTEYN, E. YE.

AUTHORS: Vaynshteyn, E. Ye., Bril', M. N., Staryy, I. B. 20-4-14/52

TITLE: On Some Rules Governing the Structure of the X-ray K -emission Spectra of Titanium in Titanates (O nekotorykh zakonomernostyakh v strukture rentgenovskikh K-spektrov ispuskaniya titana v titanatakh)

PERIODICAL: Doklady AN SSSR, 1957, Vol. 117, Nr 4, pp. 597-600 (USSR)

ABSTRACT: The authors investigated the lines of the K_β-group of titanium in the X-ray emission spectra of this element in brookite, anatase and in titanates of Mg, Ca, Sr, Ba, Fe, and Zn. From the barium titanates the monotitanates and tetratitanates ($BaO.TiO_2$ and $BaO.4\ TiO_2$) were investigated. Brief reference is made to the structure of the various titanates. The investigations were carried out by means of a focussing X-ray tube spectrograph with a quartz crystal as analyzer. The prism faces served as reflecting surfaces. The spectra were photographically registered. The authors investigated the position, the form, and the relative intensities of the lines K_{β_1}, K_{β_5}, K_β, and $K_{\beta''}$ of titanium

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On Some Rules Governing the Structure of the X-ray K - emission Spectra of Titanium in Titanates

in the above-mentioned compounds. The maxima of the lines K_{β_1} and K_{β_5} of titanium were slightly displaced towards the longwave side with all compounds compared with their position in the spectrum of the metal. The energetic position, the width and the index of asymmetry of the emission-lines of titanium do not suffer any substantial changes in the various compounds. The same holds also for the satellites $K_{\beta'}$ and $K_{\beta''}$. There are 2 figures, 2 tables, and 8 references, 6 of which are Slavic.

ASSOCIATION: Institute of Geochemistry and Analytical Chemistry imeni V. I. Vernadskiy AN USSR (Institut geokhimii i analiticheskoy khimii imeni V. I. Vernadskogo Akademii nauk SSSR) Pedagogical Institute imeni K. D. Ushinskiy, Odessa (Odesskiy pedagogicheskiy institut imeni K. D. Ushinskogo)

PRESENTED: June 27, 1957, by A. P. Vinogradov, Academician.

SUBMITTED: June 11, 1957

20-4-14/52

On Some Rules Governing the Structure of the X-ray K - emission Spectra of Titanium in Titanates

AVAILABLE: Library of Congress

Card 3/3

VAYNSHTEYN, E.YE.

5(2) PHASE I BOOK EXPLOITATION SOV/1727

Akademiya nauk SSSR. Institut geokhimii i analiticheskoy khimii

Redkozemel'nyye elementy; polucheniye, analiz, primeneniye (Rare Earth Elements; Extraction, Analysis and Application) Moscow, Izd-vo AN SSSR, 1958. 331 p. 2,200 copies printed.

Resp. Ed.: D. I. Ryabchikov, Professor; Editorial Board: I. P. Alimarin, Corresponding Member, USSR Academy of Sciences, I. N. Zaozerskiy, Doctor of Chemical Sciences, R. V. Koglyarov, Candidate of Technical Sciences, V. I. Kuznetsov, Doctor of Chemical Sciences, M. M. Senyavin, Candidate of Chemical Sciences, and Yu. S. Sklyarenko, Candidate of Chemical Sciences; Eds. of Publishing House: D. N. Trifonov and T. G. Levi; Tech. Ed.: S. G. Markovich.

PURPOSE: This book is intended for scientists, chemists, teachers and students of higher educational institutions, chemical and industrial engineers, and other persons concerned with the extraction, preparation, use, or study of rare earth elements.

COVERAGE: This collection contains reports presented at the June 1956 Conference on Rare Earth Elements at the Institute of Geochemistry and Analytical Chemistry imeni V. I. Vernadskiy of the Academy of Sciences USSR. The articles treat chemical methods of separating rare earth mixtures, methods of processing rare earth ores, ion exchange chromatography, chemical analysis, and some industrial applications of rare earths. Aside from contributing authors, the editors mention the following Soviet scientists, who are studying rare earth elements, rare earth deposits, extraction methods, and the preparation of oxides and salts: Martynov, Mel'nikov, Khrushchev, Melikov, Pisarzhevskiy, Chernyak, Tanatar, Belousov, Zhukov and especially, N. A. Orlov, who first obtained the majority of rare earth elements in the pure state, separated many complex molecular compounds of these elements, and determined their specific properties. References are given at the end of each article.

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VAYNSHTEYN, E. Ye. (Inst of Geochemistry and Analytical Chemistry im V. I. Ver...

"The Use of Tagged Atoms in Spectrum Analysis"

Isotopes and Radiation in Chemistry, Collection of Papers of 2nd All-Union Sci.Tech. Conf. on Use of Radioactive and Stable Isotopes and Radiation in National Economy and Science, Moscow, Izd-vo AN SSSR, 1958, 380pp.

This volume publishes the reports of the Chemistry Section of the 2nd All Sci Tech Conf on Use of Radioactive and Stable Isotopes and Radiation in Science and the National Economy, sponsored by Acad. Sci. USSR and Main Admin for Utilization of Atomic Energy under Council of Ministers USSR, Moscow, 6-12 April 1957.

7-58-3-9/15

AUTHORS: Vaynshteyn, E. Ye., Tugarinov, A. I., Tuzova, A. M., Shevaleyevskiy, I. D.

TITLE: On the Hafnium-Zirconium Ratio in Metamorphic and Metasomatic Rocks(O sootnoshenii gafniya i tsirkoniya v metamorficheskikh i metasomaticheskikh porodakh)

PERIODICAL: Geokhimiya, 1958, Nr 3, pp. 241 - 244 (USSR)

ABSTRACT: The distribution of zirconium and hafnium was investigated in 14 samples from the upper sequence of the Krivorozh'ye Rog--series. Five samples of them are from Sredneye Krivorozh'ye, nine samples from Severnoye Krivorozh'ye. The content was determined by means of X-ray spectral analysis, the applied method was described already earlier by the authors (Ref 1). A table gives the content of the single samples of ZrO_2, HfO_2, as well as the zirconium oxide-hafnium oxide ratio. This lies in metamorphic rocks between 20 and 40 (Sredneye Krivorozh'ye). In metasomatic rocks (Severnoye Krivorozh'ye), especially in natron rocks, zirconium is enriched; the ratio to hafnium

Card 1/2

On the Hafnium-Zirconium Ratio in Metamorphic and Metasomatic Rocks

7-58-3-9/15

oxide rises up to 112. In order to explain these differences, some properties of zirconium and hafnium are compared in a small table (ion radius, ionization potential in eV, formation heat of the oxides). The differences in the migration capacity must, however, not be explained by the ion properties only, since these elements were complexes under natural conditions, e.g. as the rare earths as alkaline carbonate complexes. There are 2 tables and 2 references, 2 of which are Soviet.

ASSOCIATION: Institut geokhimii i analiticheskoy khimii im.V.I.Vernadskogo, AN SSR, Moskva (Moscow Institute of Geochemistry and Analytical Chemistry imeni V.I.Vernadskiy, AS USSR)

SUBMITTED: January 14, 1958

1. Rock--Analysis 2. Hafnium--Determination 3. Zirconium--Determination 4. X-ray spectrum analyzers--Applications

Card 2/2

7-58-3-10/15

AUTHORS: Vaynshteyn, E. Ye., Sidorenko, G. A., Tugarinov, A. I., Turanskaya, N. V.

TITLE: On the Ratio of Individual Rare Earths in Gadolinite (O soot-noshenii individual'nykh redkikh zemel' v gadolinite)

PERIODICAL: Geokhimiya, 1958, Nr 3, pp. 245 - 247 (USSR)

ABSTRACT: Five samples of gadolinite from Sweden (Ytterby/Itterbi/ Nr 51372, Ytterby Nr 3, Ytterby Nr 51374), Norway (Khittero Nr 51366) and of northern Caucasus (river Indysh, sample of G.D.Afanas'yev) were investigated by means of X-ray spectral analysis as well as radiographically. The first table gives the relative content in the case of the individual rare earths for the individual samples with respect to the element neodymium. The second table contains the measuring results from the debyegrams of four samples. The obtained results show that the ratio of the cerium earths is comparatively constant, whereas the ratio of the yttrium oxides is subjected to small fluctuations. These fluctuations do, however, not influence the

Card 1/2

On the Ratio of Individual Rare Earths in Gadolinite 7-58-3-1c/15

structure of the mineral, as is shown by the X-ray diagrams; the absence of several lines of secondary importance in two samples points out a partial destruction of the crystal lattice. The constancy of the structure parameters of gadolinite and its close paragenetic association with yttrium-containing minerals renders the existence of cerogadolinite rather dubious. There are 2 tables and 4 references, 3 of which are Soviet.

ASSOCIATION: Institut geokhimii i analiticheskoy khimii im.V.I.Vernadskogo, AN USSR, Moskva (Moscow Institute of Geochemistry and Analytical Chemistry imeni V.I.Vernadskiy, AS USSR)

SUBMITTED: January 10, 1958

1. Gadolinite--Analysis 2. Rare earths--Determination
3. X-ray spectrum analyzers--Applications

Card 2/2

VAYNSHTEYN, E.Ye.; PAVLENKO, L.I.

Investigating the effect of the bulk composition of rocks on the results of the quantitative spectral determination of Mo in granitoids. Fiz.sbor. no.4:120-123 '58. (MIRA 12:5)

1. Institut geokhimii i analiticheskoy khimii imeni V.I. Vernadskogo AN SSSR.
(Molybdenum--Spectra) (Rocks--Analysis)

SOV/7-58-5-1/15

AUTHORS: Vinogradov, A. P., Vaynshteyn, E. Ye., Pavlenko, L. I.

TITLE: Tungsten and Molybdenum in Pyrogenous Rocks (On the Geochemistry of Tungsten)(Vol'fram i molibden v izverzhennykh gornykh porodakh (k geokhimii vol'frama))

PERIODICAL: Geokhimiya, 1958, Nr 5, pp 399 - 408 (USSR)

ABSTRACT: The authors briefly discuss the geochemistry of molybdenum and tungsten. The method of analysis is then described: Molybdenum and tungsten are precipitated by means of methyl-violet and are determined in 2 parts by the spectrographs Qu-24 and ISP-51A respectively. The calibration curve and the results obtained from the analysis carried out for purposes of control were set forth. The objects of investigation were ultra-basic rocks of the Ural-Mountains and of the Siberian Plateau, basic rocks from basalts and diabases of Kamchatka, of the Caucasus and Baykal region different kinds of gabbros, intermediary rocks such as granodiorites and diorites of the Caucasus, acid rocks such as granites of the Caucasus area, of Kazakhstan and of the Baykal region. The results of the spectroscopic analysis are classified in tables for the individual

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Tungsten and Molybdenum in Pyrogenous Rocks (On the Geochemistry of Tungsten) SOV/7-58-5-1/15

types of rocks, a diagram illustrates the varying percentage of tungsten and molybdenum with an increasing percentage of silic acid. Hence it is concluded that:1) The percentage of tungsten in pyrogenous rocks rises from ultrabasic ($7,7 \cdot 10^{-5}$%) to acidic rocks ($2,4 \cdot 10^{-4}$%) parallel with the percentage of molybdenum (from ($2,3 \cdot 10^{-5}$% to $1,6 \cdot 10^{-4}$%) in other words it develops according to the percentage of silicic acid. The percentage of tungsten is 1,5 to 2 times higher than that of molybdenum. Only basic rocks form an exception; still, it must be found out whether this is a general rule. 2) The mean percentage of tungsten is estimated at $2 \cdot 10^{-4}$% and that of molybdenum at $1,5 \cdot 10^{-4}$% in the crust of the earth; the mean proportion of molybdenum and tungsten is close to 0,7 in the crust of the earth. A minor test was also carried out with sedimentary rocks. A mixed sample was produced and investigated, which was taken of 7614 samples of clay of different ages which came from the Russian Plateau ($7,4 \cdot 10^{-5}$% Mo and $1,8 \cdot 10^{-4}$% W); as well as of mixed samples of 6107 samples of sand ($4 \cdot 10^{-5}$% Mo and $1,6 \cdot 10^{-4}$% W). The samples were taken by A.B.Ronov. There are 2 figures,

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Tungsten and Molybdenum in Pyrogenous Rocks (On the Geochemistry of Tungsten) SOV/7-58-5-1/15

8 tables, and 22 references, 9 of which are Soviet.

ASSOCIATION: Institut geokhimii i analiticheskoy khimii im.V.I.Vernadskogo AN SSSR, Moskva (Moscow Institute of Geochemistry and Analytic Chemistry imeni V.I.Vernadskiy, AS USSR)

SUBMITTED: June 6, 1958

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3(8)
AUTHORS: Pavlenko, A. S., Vaynshteyn, E. Ye., Kakhana, M. M. SOV/7-58-6-6/16

TITLE: On the Nb and Ta Ratio in Some Minerals of Igneous and Metasomatic Rocks (O sootnoshenii Nb i Ta v nekotorykh mineralakh izverzhennykh i metasomaticheskikh porod)

PERIODICAL: Geokhimiya, 1958, Nr 6, pp 558 - 569 (USSR)

ABSTRACT: Elements of very similar chemical properties as Nb and Ta, Zr and Hf, TR, Th and U may serve as very sensitive indicators for geological processes. In the case of TR and Zr and Hf investigations were already carried out by the authors (Refs 1 - 4). The present paper deals with an investigation of the Nb/Ta ratio in minerals from the district of Vostochnaya Tura (Ezninskiy massiv, Aksugskiy massiv, Orngtinskiy massiv, Balyktygkhemskiy massiv, Terekhol'skiy massiv, Agashskiy massiv, Dugdinskiy massiv, Milmeyskiy massiv, Ulantayginskiy massiv, Zhinkhemskiy massiv, Bayankol'skiy massiv, Khusumgol'skiy massiv). An X-ray structure analysis was made of 53 samples of columbite, fergusonite, euxenite, pyrochlore, and microlite. Most of the samples came from the Tuvinskiy otryad Instituta

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On the Nb and Ta Ratio in Some Minerals of Igneous and Metasomatic Rocks SOV/7-58-6-6/16

geokhimii i analiticheskoy khimii im. V.I. Vernadskiy AN SSSR (Department Tuva of the Institute of Geochemistry and Analytical Chemistry imeni V.I. Vernadskogo AS USSR), some were put at the authors' disposal by V. I. Kudrin, Yu. V. Makhin and I. A. Nechayeva. For X-ray analysis the samples were glued to the anode of the X-ray tube (Fig 1) by BF-2. Nb K_{α_1} and K_{β_1} as well as Ta L_{α_1} were recorded on "Agfa-Laue" X-ray film and their intensities determined by means of the microphotometer MF-2. A big table shows the results (in the order of the finding place, Table 1) and a graphical survey (in the order of the type of rock, Fig 3). Table 2 reveals the upper and lower limit of the Nb/Ta ratio in the individual minerals. Table 3 shows a comparison between the Nb/Ta and the Zr/Hf ratios in zircons from the same samples or from samples which are very close together. The Zr/Hf values are taken from a previous paper (Ref 3), a new analysis was made by I. D. Shevaleyevskiy. From the investigations carried out the following may be concluded: In the investigated rocks the Nb/Ta ratio depends mainly on the formation of magmatism and thus

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on the age of the rock. Younger complexes contain comparatively more niobium. In the minerals of a certain complex the Nb/Ta ratio keeps within the same limits. The alkali content of the rocks has no influence on the Nb/Ta ratio as is the case with the Zr/Hf ratio. Genetical factors influence the Nb/Ta ratio in the same way as the Zr/Hf ratio, however, to a smaller extent. Great changes occur only in the case of euxenites. There are 3 figures, 3 tables, and 8 references, 7 of which are Soviet.

ASSOCIATION: Institut geokhimii i analiticheskoy khimii im. V.I. Vernadskogo AN SSSR, Moskva (Institute of Geochemistry and Analytical Chemistry imeni V.I. Vernadskiy, AS USSR, Moscow)

Card 3/3

SOV/75-13-4-2/29

AUTHORS: Vaynshteyn, E. Ye., Belyayev, Yu. I.

TITLE: Application of Radioactive Isotopes in the Investigation of the Spatial Distribution of Elements in Direct-Current-Arc Plasma During Spectrochemical Determination of Impurities in Uranium (Primeneniye radioaktivnykh izotopov dlya issledovaniya prostranstvennogo raspredeleniya elementov v plazme dugi postoyannogo toka pri spektral'nom opredelenii primesey v urane)

PERIODICAL: Zhurnal analiticheskoy khimii, 1958, Vol. 13, Nr 4, pp. 388-395 (USSR)

ABSTRACT: Based on the present paper the following was found:
1) The spatial distribution of the atoms of different elements in a direct-current-arc plasma is inhomogeneous and mainly depends on the volatility of the element or its compound at the temperature occurring under the conditions of analysis. The ions of elements with a low ionization potential are concentrated in the space about the cathode. The spatial distribution of an element is practically independent of its content in the sample.
2) If in a medium of low volatility apart from the constituent

Application of Radioactive Isotopes in the Investigation of the Spatial Distribution of Elements in Direct-Current-Arc Plasma During Spectrochemical Determination of Impurities in Uranium

to be analyzed large quantities of another element (a macrocomponent) is present, the atoms of which exhibit a distribution in the space between the electrodes differing from that of the atoms of the constituent to be determined, the distribution of all remaining elements beginning from a certain content is determined by the distribution of the macrocomponent. In presence of 2 macrocomponents, the atoms of which have a different distribution, the elements of the impurities follow the atoms of that macrocomponent, of which there is a greater quantity. If the quantities of the macrocomponents are approximately equal, the impurities of both components are influenced to the same extent.

3) The elements of the compounds which are usually used as carriers in spectral analysis are characterized by their distribution between the electrodes in the form of a symmetrical arc which shows a distinct peak in the center. The character of the distribution is independent of the method by which the carrier substance was brought into the space between the electrodes. The increased intensity of the lines of the impurity

Application of Radioactive Isotopes in the Investigation of the Spatial Distribution of Elements in Direct-Current-Arc Plasma During Spectrochemical Determination of Impurities in Uranium

elements in the presence of such carriers is not connected with a modification of the speed by which these elements enter the plasma. The carrier only influences the distribution of the admixed elements between the electrodes and leads to their concentration in the central part of the plasma. This lowers the degree of dispersion of the atoms. Therefore the influence of the carrier on the intensity of the spectral lines has no selective character. If in the sample large quantities of elements are found the atoms of which are more asymmetrically distributed in the plasma of the arc than the atoms of the carrier, the influence of the carrier can be highly reduced or entirely suspended.

4) The differences in the spatial distribution of the elements between the electrodes of the arc and the influence exerted on them by the composition of the sample are some of the factors determining the dependence of the results of the spectral analysis on the entire composition of the sample and the oc-

Application of Radioactive Isotopes in the Investigation of the Spatial Distribution of Elements in Direct-Current-Arc Plasma During Spectrochemical Determination of Impurities in Uranium

currence of the so-called "3rd components" in the sample. This factor, however, is not satisfactorily investigated as yet.
For the investigation of the spatial distribution of the elements radioactive isotopes were used, the γ-radiation of which was measured photographically. Pitchblende with its different impurities was investigated.
There are 9 figures and 4 references, 2 of which are Soviet.

ASSOCIATION: Institut geokhimii i analiticheskoy khimii im. V. I. Vernadskogo AN SSSR, Moskva (Institute of Geochemistry and Analytical Chemistry imeni Vernadskiy of the AS USSR, Moscow)

SUBMITTED: February 26, 1958

1. Radioisotopes--Applications 2. Electron gas--Structural analysis
3. Uranium--Chemical impurities 4. Spectrographic analysis --Applications

5(2)
AUTHORS: Korolev, V. V., Vaynshteyn, E. Ye. SOV/75-13-6-1/21

TITLE: The Use of an Impulse Source for Spectra Excitation in the Spectral Analysis of Silicates (Primeneniye impul'snogo istochnika vozbuzhdeniya spektrov dlya vypolneniya spektral'nogo analiza silikatov)

PERIODICAL: Zhurnal analiticheskoy khimii, 1958, Vol 13, Nr 6, pp 627-634 (USSR)

ABSTRACT: The known spectroscopic methods for the performance of silicate analyses (Refs 1-9) require troublesome preliminary operations and have a relatively low sensitivity. By the use of high-temperature impulse sources for the excitation of the spectra, however, the accuracy of the spectrum analysis of silicates can be increased. Levintov (Refs 10-13) used an impulse source for the spectroscopic determination of metalloids. The impulse intensification of the current of a stationary arc was therein realized by the periodic discharge of a high-tension condenser by this current. Such a high-temperature impulse source was also used by the authors of the present paper. As stationary element a direct-current arc with carbon electrodes was used which was fed by a mercury

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rectifier, and as impulse element a condensed spark from an IG-2 generator. Optimum conditions of this impulse source were experimentally determined by using data of publications (Refs 18-20). These conditions are referred to in the paper, as well as a wiring diagram of this device. The intensification of the impulse thus attained an intensity of 400-500 A. For temperature determination of the impulse arc a simplified modification of the method described by Ornstein (Refs 21,22) was used. This method is applicable to impulse sources in which a Boltzmann distribution of the atoms and ions is occurring on maintained equilibrium. If the absolute values of the probability of the transitions are unknown for the various spectral lines, by means of this method the temperature of the source can be approximately estimated by comparison with another source the temperature of which is known. In this way, temperatures of nearly 10000°K were determined for the impulse source used. The source described possesses a much more homogeneous distribution of the excited atoms and ions in the plasma than an ordinary direct-current arc. The relative intensity of the lines of various elements depends

The Use of an Impulse Source for Spectra Excitation in the Spectral Analysis of Silicates

only slightly on their homology. By means of this impulse source the authors have devised a method for the quantitative spectroscopic determination of Si, Ti, Al, Fe, Ca, Mg, Mn, Na and K in silicates. This method does not require an intense dilution of the sample with copper oxide and coal powder. The average arithmetic error of the determination of the elements mentioned is 2-3%. The maximum deviations between the spectroscopic and chemical analyses carried out do not exceed 4%. The application of the new determination method devised is described there in detail. There are 9 figures, 3 tables, and 27 references, 19 of which are Soviet.

ASSOCIATION: Institut geokhimii i analiticheskoy khimii im. V. I. Vernadskogo AN SSSR, Moskva (Moscow Institute of Geochemistry and Analytical Chemistry imeni V. I. Vernadskiy AS USSR)

SUBMITTED: March 11, 1958

VAYNSHTEYN, E. Ye.

The UNESCO Conference Concerning the Utilization of Radioactive Isotopes in Scientific Research, Paris, 9-20 Sept. 1957 30-1-12/39

Vestnik AN SSSR, 28, 1, 1958, p. 71-78 (author Vinogradov, A. P.;

of applying marked atoms in the field of physical and chemical processes. M. A. Starikovich spoke about the results obtained by investigations with marked atoms as regards the distribution of many salts between water and steam. In reports delivered by E. Ye. Vaynshteyn, L. Ye. Pavlenko and Yu I. Belyayev the application of radioactive isotopes in spectral analysis was dealt with. S. S. Medvedev spoke about problems of the polymerization of ethylene in its gaseous and liquid phase. E. K. Gerling's report on the migration of isomerism K^{40} in nature was read out. V. I. Baranov and L. A. Kuz'min submitted material on the determination of the velocity of the formation of salt on the bottom of the ocean. The author reported on the isotope composition of the milieu of meteorites, rocks, sulphides, etc. On the strength of these data he expressed the idea concerning the difference in processes of creation of various classes of meteorites and various types of the crust of the earth

AVAILABLE: Library of Congress

Card 3/3 1. Isotopes (Radioactive)-Applications

SOV/2o-122-2-1o/42

24(7)

AUTHORS: Vaynshteyn, E. Ye., Bril', M. M., Staryy, I. B.

TITLE: The Fine Structure of the X-Ray Absorption K-Spectra of Titanium in Titanates (Tonkaya struktura rentgenovskikh K-spektrov pogloshcheniya titana v titanatakh)

PERIODICAL: Doklady Akademii nauk SSSR, 1958, Vol 122, Nr 2, pp 2o1-2o3 (USSR)

ABSTRACT: In a previous paper the fine structure of the X-ray emission K-spectra of titanium in the titanates of Mg, Ca, Ba, Sr, Fe, Zn was investigated. This paper gives results concerning the absorption K-spectra of titanium in the same titanates. These spectra were investigated by means of a focussing X-ray tube spectrograph with a curved quartz crystal. The investigations were carried out by means of absorbers of various thickness (3 - 14 mg/cm^2). The short-wave structure of the edge appears most clearly and without distortions in the spectra of thin absorbers. The intensity then decreases and the structure of the long-wave group of the absorption lines appears, but only faintly. In the spectra of thick absorbers, the succession is reversed. The most favorable thick-

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ness of the absorbers was ~5 mg/cm^2. The absorption spectra found for titanium, for the above mentioned titanates, and for rutile (TiO_2) are represented in some diagrams. From these experimental results the following conclusions may be drawn: 1) The X-ray absorption spectra of titanium in titanates are characterized by a distinct fine structure which has many fluctuations. The shape of this fine structure depends on the type of the crystal structure, on the characteristic features of the chemical bonds in the compound, and on the polarization state of the titanium atoms and oxygen atoms in this compound. The edge of the absorption of titanium in $ZnTiO_3$ has the simplest shape. 2) In the X-ray absorption spectra of titanium in compounds which have a crystal structure of the ilmenite type ($FeTiO_3$, $MgTiO_3$), the shape of the long wave absorption band and the point of its maximum (with respect to the energy) remain the same as in the spectra of $ZnTiO_3$. However, the fine structure of the short-wave region of the absorption edge has a more complicated structure. 3) In the absorption spectra of titanium in rutile and in compounds of the structure of the perkovskite type, a splitting

The Fine Structure of the X-Ray Absorption K-Spectra of Titanium in Titanates

up of the long wave band into a doublet is observed. The structure of the principal absorption edge of titanium in compounds of the perovskite type only slightly depends on the nature and on the dimensions of the kation, but it depends to a considerable extent on the polarization of the atoms in the investigated compound. The positions of the centers of gravity of the complicated (with respect to the structure) absorption bands of titanium in $BaTiO_3$ corresponds approximately to the position of the absorption maxima of the spectrum of titanium in barium tetratitanate. Finally, the authors compare their interpetation of the above-discussed facts with the interpretation given by M. A. Blokhin (Ref 4). There are 4 figures and 4 references, 4 of which are Soviet.

ASSOCIATION: Institut geokhimii i analiticheskoy khimii im. V. I. Vernadskogo Akademii nauk SSSR
(Institute of Geochemistry and Analytical Chemistry imeni V. I. Vernadskiy AS USSR)

SOV/2o-122-2-1o/42

The Fine Structure of the X-Ray Absorption K-Spectra of Titanium in Titanates

Odesskiy pedagogicheskiy institut im. K. D. Ushinskogo
(Odessa Pedagogical Institute imeni K. D. Ushinskiy)

PRESENTED: May 19, 1958, by A. P. Vinogradov, Academician

SUBMITTED: May 15, 1958

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SOV/20-122-3-11/57

24(7)
AUTHORS: Vaynshteyn, E. Ye., Staryy, I. B., Zhurakovskiy, Ye. A.

TITLE: The Fine Structure of the X-Ray Absorption K-Spectra of Titanium in Carbides (Tonkaya struktura rentgenovskikh K-spektrov pogloshcheniya titana v karbidakh)

PERIODICAL: Doklady Akademii nauk SSSR, 1958, Vol 122, Nr 3, pp 365-366 (USSR)

ABSTRACT: In the papers hitherto published, the fine structure of the X-ray K-emission spectrum of titanium, and of the L-absorption spectrum of molybdenum in carbides and in some other compounds were investigated. This paper gives data on the absorption K-spectra of titanium in alloys of the system Ti-C which contain 12 - 24 weight % of carbon. The measurements were carried out by means of a focusing X-ray tube spectrograph, and the spectra were recorded photographically. The found spectra (which are the average results of 6 independent measurements) are shown by a diagram. The same figure shows the positions of the last K_{β_3} and $K_{\beta''}$ emission lines of

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The Fine Structure of the X-Ray Absorption K-Spectra of Titanium in Carbides

shape of the long-wave absorption band. In the second diagram the X-ray absorption spectrum of titanium in carbide is compared with the spectrum of this element in dioxide (rutile). The fine structure of the absorption spectra of titanium in carbides remains constant in the entire interval of the carbon concentrations in which there is a one-phase region with a face-centered cubic lattice of metal atoms. Also the position and the shape of the long-wave band in the absorption spectrum of titanium in the investigated group of alloys remain constant. There are 2 figures and 7 references, 7 of which are Soviet.

ASSOCIATION: Institut geokhimii i analiticheskoy khimii im. V.I. Vernadskogo Akademii nauk SSSR (Institute of Geochemistry and Analytical Chemistry imeni V.I.Vernadskiy, Academy of Sciences, USSR)
Odesskiy pedagogicheskiy institut im. K.D. Ushinskogo (Odessa Pedagogic Institute imeni K. D. Ushinskiy)

PRESENTED: May 19, 1958, by A. P. Vinogradov, Academician

SUBMITTED: May 15, 1958

VAYNSHTEYN, Emmanuil Yefimovich for Doc Chem Sci on the basis of dissertation defended 3 Mar 59 in Council of Inst of Geochemistry and Analytic Chem im Vernadskiy, Acad Sci USSR, entitled "Studies in the field of X-ray spectrum analysis." (BMViSSO USSR, 1-61, 25)

VAYNSHTEYN, Z. Ye.

5(2) PHASE I BOOK EXPLOITATION SOV/2302

Analitika nauk SSSR. Institut geokhimii i analiticheskoy khimii

Redkozemel'nye elementy; analiz, primeneniye (Rare Earth Elements: Production, Analysis, and Use) Moscow, Izd-vo AN SSSR, 1959. 331 p. 5,000 copies printed.

Resp. Ed.: D. I. Ryabchikov, Professor; Eds. of Publishing House: D. N. Trifonov and T.G. Levi; Tech. Ed.: S. G. Markovich; Editorial Board: I. P. Alimarin, Corresponding Member, USSR Academy of Sciences; I. N. Zavarzin, Doctor of Chemical Sciences; E. V. Kotlyarov, Candidate of Chemical Sciences; V. I. Nikitaev, Doctor of Chemical Sciences; M. M. Senyavin, Candidate of Chemical Sciences; and Yu. S. Shlyamin, Candidate of Chemical Sciences.

PURPOSE: This book is intended for chemists in general and for geochemists and analytical chemists in particular.

COVERAGE: This collection of articles contains reports presented at the Rare Earth Elements Symposium held in June 1956 at the Institute of Geochemistry and Analytical Chemistry imeni V. I. Vernadskiy. The book may be divided into three sections: the characteristics, uses and production of rare earth elements (REE); the methods of analyzing REE; and the application of individual rare earth elements in the glass and metallurgical industries, and their use as catalysts. Considerable space is devoted to the application of ion-exchange chromatography to the production of pure forms of all rare earth elements. The contents of this book deal with other methods in separating REE as an industrial scale are discussed by D. I. Ryabchikov, Yu. S. Shlyamin, and K. N. Sayenko. Chemical methods of separating REE compounds are discussed by I. N. Zavarzin (who is said to be the first in the USSR to develop methods of preparing REE), V. P. Kotlyarov, E. P. Antropova, A. V. Nikolayev, and O. P. Alekseyeva. Quantitative X-ray spectral analytical methods are described by E. Ye. Vaynshteyn, and chemical methods of analysis by I. P. Alimarin and Z. I. Ryabukhina. The determination of REE impurities in pure products and atomic materials are discussed at length in three articles by A. N. Zaydel' and his associates. All articles are accompanied by photographs, diagrams, tables, and bibliographic references.

Polyakov, N.S., and [illegible] Nikonova. Fluorescent Determination of Small Quantities of Yttrium 205

Ponomarev, V. I., and N. A. Tarasevich. On the Problem of an Accelerated Method of Determining the Content of Rare Earth Oxide in a KU-2b Preparation 214

Vaynshteyn, E. Ye., I. P. Alimarin, and A. P. Vinogradov. The Process of Applying the Ion-Exchange Method of Analysis in Controlling Technological Processes in Obtaining Individual Rare Earth Elements 217

Zaydel', A. N., M. I. Kalinovskiy, and A. N. Zaranovskiy. Spectrochemical Determination of Sr, Ba, and Sm in Atomic Materials. Communication I. Principle of the Method and Its Application to the Analysis of Beryllium 239

Zaydel', A. N., M. I. Kalinovskiy, A. N. Zaranovskiy, and P. P. Yelinson. Spectrochemical Determination of Sr, Ba, and Sm in Atomic Materials. Communication II. Analysis of Rare Earths and Yttrium 251

SOV/7-59-2-5/14

3(8)
AUTHORS: Vaynshteyn, E. Ye., Ginzburg, A. I., Shevaleyevskiy, I. D.

TITLE: On the Ratio of Hafnium and Zirconium in the Zircons of Granite Pegmatites (O sootnoshenii gafniya i tsirkoniya v tsirkonakh granitnykh pegmatitov)

PERIODICAL: Geokhimiya, 1959, Nr 2, pp 124-129 (USSR)

ABSTRACT: 25 samples of the zircon group were investigated by the X-ray spectrographic method. The samples were: 1) zircons from medium- and coarse-grained plagioclase-mircocline-biotite pegmatites (Table 1, Analyses 1-7); 0.7-1.4% HfO_2, ZrO_2/HfO_2 between 46 and 89. 2) Cirtolites from uranium - rare earths pegmatites (Table 1, Analyses 8-13); 2.7-6.1% HfO_2, ZrO_2/HfO_2 9-21. 3) Cirtolite from a beryl - muscovite pegmatite (Table 1, Analysis 14); HfO_2 3.3%, ZrO_2/HfO_2 17.3. 4) Cirtolites from strongly albitized pegmatites (Table 1, Analyses 15-18); 5.3-7.4 % HfO_2, ZrO_2/HfO_2 8 - 11.5. 5) Late cirtolites from replacement pegmatites bearing rare metals (Table 1, Analyses 19 - 24); 6.6 - 13.8% HfO_2, the ZrO_2/HfO_2 ratio varies between 3.7 and 9.1. Table 2 is a summary of table 1. This in-

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On the Ratio of Hafnium and Zirconium in the Zircons of Granite Pegmatites

vestigation shows that hafnium is enriched in the course of the pegmatite process while the zirconium-hafnium ratio decreases; early formed zircons correspond completely to the zircons contained in granites. In pegmatites descended from alkali syenites or granosyenites zircons habe a strikingly high zirconium-hafnium ratio. This may be used in determining genetic relationships. Zircons of metasomatic origin have a ZrO_2/HfO_2 ratio of between 3 and 20, while the ratio to be found in zircons from pneumatolytic - hydrothermal ore veins ranges from 25 to 45. Zircons of the last stages of the pegmatitic process contain up to 14% HfO_2; they may be regarded as hafnium minerals proper. There are 2 tables and 9 Soviet. references.

ASSOCIATION: Institut geokhimii i analaticheskoy khimii im. V. I. Vernadskogo AN SSSR (Institute of Geochemistry and Analytical Chemistry imeni V. I. Vernadskiy AS USSR). Vsesoyuznyy institut mineral'nogo syr'ya, Moskva (All-Union Institute of Mineral Raw Materials, Moscow)

SUBMITTED: November 13, 1958

5 (4)
AUTHORS: Vaynshteyn, E. Ye., Zhurakovskiy, Ye. A. SOV/62-59-8-30/42

TITLE: The Fine Structure of the X-Ray K-Absorption Spectra of Titanium in Some Hydrides, Borides, and Silicides

PERIODICAL: Izvestiya Akademii nauk SSSR. Otdeleniye khimicheskikh nauk, 1959, Nr 8, pp 1493-1495 (USSR)

ABSTRACT: By means of the X-ray spectrum method new data have been obtained in recent times which explain questions of the inter-atomic forces prevailing in the hydrides, carbides, and nitrides of Ti, V, and Mo. In the present paper the titanium borides and silicides are investigated X-ray-spectrum analytically, in continuation of the work mentioned above. In the crystals, the silicides form embedding phases with structural elements similar to chains or layers. The borides are somewhere in between intermetallic compounds and the classical embedding phases. The boron atoms may be connected like chains, or they form dimeric layers or trimeric crystal lattice skeletons. This is due to the tendency exhibited by both elements to form clearly covalent compounds. The following borides were investigated: TiB and TiB_2; the silicides investigated were Ti_5Si_2, TiSi, $TiSi_2$. The

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compounds were prepared at the Institut metallokeramiki i spetsial'nykh splavov AN USSR (Institute of Cermets and Special Alloys of the Academy of Sciences, UkrSSR). Experimental conditions were the same as in references 5-7. The absorption spectra of pure metal, some hydrides, the compounds investigated, and TiO_2 are shown in a figure. The investigations confirmed the hypothesis that the hydrogen in the hydrides is in a state similar to metal. From the results of similar investigations of Va (Ref 7) it is concluded that this hypothesis holds generally. It was seen from the spectra of the borides and silicides that the degree and character of the participation of the 3a'-level of titanium in the formation of the metallic bond varies with the different compositions of the compounds. The greater the number of boron or silicon atoms in the compounds, the more marked is the covalent bond between the atoms. The structural elements of the metalloids are more and more weakened. There are 1 figure and 10 references, 9 of which are Soviet.

The Fine Structure of the X-Ray K-Absorption Spectra of Titanium in Some Hydrides, Borides, and Silicides

SOV/62-59-8-30/42

ASSOCIATION: Institut geokhimii i analiticheskoy khimii Akademii nauk SSSR (Institute of Geochemistry and Analytical Chemistry of the Academy of Sciences, USSR). Odesskiy pedagogicheskiy institut im. D. N. Ushinskogo (Odessa Pedagogical Institute imeni D. N. Ushinskiy)

SUBMITTED: February 14, 1959

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18(7)

SOV/78-4-1-47/48

AUTHORS: Vaynshteyn, E. Ye., Zhurakovskiy, Ye. A., Staryy, I. B.

TITLE: On Some Results of the X-Ray Spectral Analysis of the Physical Nature of the Intrusion Phases (O nekotorykh rezul'tatakh rentgenospektral'nogo issledovaniya fizicheskoy prirody faz vnedreniya)

PERIODICAL: Zhurnal neorganicheskoy khimii, 1959, Vol 4, Nr 1, pp 245-246 (USSR)

ABSTRACT: The X-ray-K-absorption spectra of titanium in nitrides, in alloys of the system Ti-C with carbon contents of 9 to 24 wt %, in three hydrides with a hydrogen content of 1, 2, and more than 3 wt %, and in titanium diboride (TiB_2) were investigated. Some of the results are shown in figures 1 and 2. The X-ray absorption spectra of titanium in hydrides of various hydrogen contents have a different fine structure. The reciprocal effect of the transition metal and the nonmetal in hydrides differs qualitatively from the reciprocal effect in carbides and nitrides. The X-ray absorption spectra of titanium in titanium diboride are very complicated; this is probably caused by the complicated crystalline structure of this compound. In order

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to explain the physical nature of the binding forces in the borides, further systematic investigations are required. There are 2 figures and 12 references, 7 of which are Soviet.

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TITLE: On Some Rules in the Behavior of the Rare Earths and Yttrium in Magmatic and Postmagmatic Processes (O nekotorykh zakonomernostyakh povedeniya redkikh zemel' i ittriya v magmaticheskikh i postmagmaticheskikh protsessakh)

PERIODICAL: Geokhimiya, 1959, Nr 4, pp 291 - 309 (USSR)

ABSTRACT: The Middle Paleozoic syutkhol'skiy granite (γPz_2) and the somewhat younger alkaline rock complex εPz_2, which has two phases, were investigated in the Vostochno-Tuvinskiy region. The rocks were divided into the following groups: magmatic rocks, pegmatites, autometasomatic rocks, and exocontact metasomatites, highly hydrothermal dikes included. Only minerals with a sufficiently high content of TR were examined so that the latter could be measured immediately by X-ray fluorescence: pyrochlorine, fergusonite, euxenite, "aschynite", parisite, monazite, a mineral of the "cheralite" type, "britholith", "chevkinite", orthite, and gadolinite, furthermore also thorite, although its content is low. The distribution of the samples to the different rock complexes and

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